

FIVE-YEAR REVIEW

Superfund Records Center

SITE: McKin

BREAK: 8-3

OTHER: 48619

MCKIN COMPANY SITE GRAY, MAINE

RESPONSE ACTION CONTRACT (RAC), REGION I

**For
U.S. Environmental Protection Agency**

**By
Tetra Tech NUS, Inc.**

**EPA Contract No. 68-W6-0045
EPA Work Assignment No. 131-FRFE-0136
TtNUS Project No. N7611**

September 2003



TETRA TECH NUS, INC.

FIVE-YEAR REVIEW REPORT

McKIN COMPANY SUPERFUND SITE

GRAY, MAINE

Prepared by:

U.S. Environmental Protection Agency

Region I

Boston, Massachusetts

Susan Studlien
Susan Studlien, Acting Director
Office of Site Remediation and Restoration

9/22/03
Date



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

MEMORANDUM

DATE: September 19, 2003

SUBJ: Five-Year Review
McKin Company Superfund Site

FROM: Terrence Connelly *T Connelly*
ME, VT, and CT Superfund Section

THRU: Mary Jane O'Donnell, Chief *MJO* *CRN*
ME, VT, and CT Superfund Section

TO: Susan Studlien, Acting Director
OSRR

Summary of Action

Attached for your review and signature is the third five-year review report for the McKin Company Superfund Site, the ("Site") in Gray, Maine. This review covers the entire Site. EPA Region I conducted this review pursuant to CERCLA section 121(c), National Oil and Hazardous Substances Pollution Contingency Plan (NCP) section 300.430(f)(4)(ii), and OSWER Directives 9355.7-02 (May 23, 1991), and 9355.7-02A (July 26, 1994). This is a statutory review, conducted for post-October 17, 1986 Remedial Actions. The purpose of a five-year review is to ensure that a remedial action remains protective of human health and the environment.

Major Issues

This five-year review is the first since EPA determined that it was technically impracticable to restore the groundwater beneath the site to drinking water quality within a reasonable time frame and thus waived attainment of these ARARs for the Site. Following the technical impracticability determination, in March 2001 EPA issued a ROD amendment changing the management of migration component from active pump and treat to one relying on overlapping institutional controls, long-term monitoring, installation of additional plume monitoring wells, and five-year reviews.

This five-year review process revealed that the 2001 selected remedy has generally been

implemented. The Town of Gray has adopted a zoning ordinance preventing the use of groundwater in the area surrounding the Site. Owners of sub-dividable properties with the institutional control zone have placed restrictive covenants on their property, relinquishing their rights to the groundwater. In a separate agreement, the Settling Parties have provided funding to the Gray Water District to provide additional capacity to their system. The Settling Parties have yet to gain a restrictive covenant on the McKin property.

The Settling Parties continue to monitor groundwater quality as well as surface water quality in the Royal River. The data indicate trichloroethene concentrations are decreasing throughout the Site and in the river.

Access for the new series of monitoring wells has not been gained (all were to be placed on private properties). These wells were to provide greater certainty that the conceptual understanding of the extent of contamination is correct and would increase confidence that the institutional control zone boundaries are appropriate.

A year after the ROD Amendment, EPA issued a draft guidance dealing with the vapor intrusion pathway. Per the screening process presented in this guidance, there is insufficient site data to rule out the possibility of this exposure pathway. Additional work, and possibly ongoing monitoring, will likely be needed to ensure that there is no threat to indoor air quality from VOC vapors.

Headquarters Perspective/Involvement

There has been no Headquarters involvement for this specific five-year review report. This report was modeled on three year five-year reports that were prepared last year by the same contractor and remedial project manager, all of which were reviewed by Headquarters following the June 2001 guidance document "Comprehensive Five-Year Guidance", OSWER No. 9355.7-03B-P.

Public Involvement

In late May 2003, a public notice announcing the five-year review process was published in two local papers. The press notice encouraged public participation. In addition, on May 28, 2003 EPA sent out announcements to the nineteen property owners who have placed restrictive covenants on their property. EPA also contacted the Technical Assistance Grant group. Although the community was actively involved in a two year mediation process leading up to the ROD Amendment, there was little community response to the public notice and announcements. All site-related documents are available at the Gray Public Library in Gray. According to staff at the library there has been limited use of the documents. A notice which briefly summarizes this five-year review will be published in a major local newspaper of general circulation.

Media-Congressional Involvement

There has been no media or congressional involvement regarding the five-year review process.

State Coordination

Maine DEP has participated in the review process, including the site inspection, interviews, and has provided comments on the draft five-year review report. Maine DEP expressed concerns regarding the new series of wells and the lack of a restrictive covenant on the McKin property. These concerns have been identified in the report as issues to be resolved.

Recommendation

The selected remedy for management of migration is expected to be protective of human health and the environment. The five-year review has identified vapor intrusion as a possible pathway that needs to be investigated to ensure that the remedy is protective. It is recommended you sign this five-year review.

Contact Person

Terrence Connelly, Remedial Project Manager
918-1373

Attachment: Five-Year Review Report

FIVE-YEAR REVIEW

MCKIN COMPANY SITE
GRAY, MAINE


RESPONSE ACTION CONTRACT (RAC), REGION I

For
U.S. Environmental Protection Agency

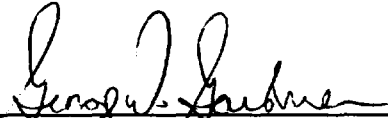
By
Tetra Tech NUS, Inc.

EPA Contract No. 68-W6-0045
EPA Work Assignment No. 131-FRFE-0136
TtNUS Project No. N7611

September 2003



Phoebe A. Call
Project Manager



George D. Gardner, P.E.
Program Manager

**TABLE OF CONTENTS
FIVE-YEAR REVIEW
MCKIN COMPANY SITE
GRAY, MAINE**

<u>SECTION</u>	<u>PAGE</u>
ES EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION	1-1
2.0 SITE CHRONOLOGY	2-1
3.0 BACKGROUND	3-1
3.1 Physical Characteristics	3-1
3.2 Land and Resource Use	3-5
3.3 History of Contamination	3-7
3.4 Initial Response	3-7
3.5 Basis for Taking Action	3-8
4.0 REMEDIAL ACTIONS	4-1
4.1 Remedy Selection (1985 ROD)	4-1
4.2 Remedy Implementation (1985 ROD)	4-2
4.2.1 On-Site Source Control Remedy	4-2
4.2.2 Off-Site Groundwater Remedy	4-3
4.3 ROD Amendment - Off-Site Groundwater	4-5
4.3.1 Description of the Modified Remedy	4-5
4.3.2 Implementation Status	4-9
4.4 Operations and Maintenance	4-11
5.0 PROGRESS SINCE LAST FIVE-YEAR REVIEW	5-1
6.0 FIVE-YEAR REVIEW PROCESS	6-1
6.1 Administrative Components	6-1
6.2 Community Notification and Involvement	6-1
6.3 Document Review	6-1
6.4 Data Review	6-2
6.4.1 On-Site Source Control Remedy	6-2
6.4.2 Off-Site Groundwater Remedy	6-2
6.5 Site Inspection	6-8
6.6 Interviews	6-8
7.0 TECHNICAL ASSESSMENT	7-1
7.1 Question A: Is The Remedy Functioning As Intended By The Decision Documents?	7-1
7.2 Question B: Are The Exposure Assumptions, Toxicity Data, Cleanup Levels And Remedial Action Objectives (RAOs) Used At The Time Of Remedy Selection Still Valid?	7-3
7.3 Question C: Has Any Other Information Come To Light That Could Call Into Question The Protectiveness Of The Remedy?	7-7

TABLE OF CONTENTS (cont.)
FIVE-YEAR REVIEW
MCKIN COMPANY SITE
GRAY, MAINE

<u>SECTION</u>	<u>PAGE</u>
7.4 Technical Assessment Summary.....	7-7
8.0 ISSUES	8-1
9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS	9-1
10.0 PROTECTIVENESS STATEMENTS.....	10-1
11.0 NEXT REVIEW.....	11-1

TABLES

<u>NUMBER</u>	<u>PAGE</u>
2-1 Chronology of Site Events	2-1
6-1 TCE Concentrations at Groundwater/Surface Water Sampling Locations.....	6-3
6-2 Estimated Time to Reach Groundwater MCL for TCE	6-5

FIGURES

<u>NUMBER</u>	<u>PAGE</u>
3-1 Site Location.....	3-2
3-2 TCE Plume and Potentiometric Surface Contours	3-3
4-1 LTMP Sample Locations.....	4-8
6-1 TCE Mass Loading into the Royal River	6-7

APPENDICES

A	Document Review List/References
B	Site Inspection Report
C	Interview List
D	ARARs and TBCs
E	MEDEP Review Comments on "Five-Year Review Report" dated August 20, 2003 and September 11, 2003

ACRONYMS

AOZ	Aquifer Overlay Zone
ARAR	Applicable or Relevant and Appropriate Requirement
AWQC	Ambient Water Quality Criteria
CCC	Criteria continuous concentration
CMC	Criteria maximum concentration
COC	Contaminant of Concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMR	Code of Maine Rules
CSF	Cancer Slope Factor
CWA	Clean Water Act
DNAPL	Dense non-aqueous phase liquid
DL	Detection Limit
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
GAC	Granular Activated Carbon
GETS	Groundwater extraction and treatment system
gpm	gallons per minute
ICZ	Institutional control zone
kg/day	kilograms per day
LTMP	Long-term monitoring plan
MCL	Maximum Contaminant Level
MEDEP	Maine Department of Environmental Protection
MEGs	Maximum Exposure Guidelines
MOM	Management of Migration
MRSA	Maine Revised Statutes Annotated
MSL	Mean Sea Level
ND	non detect
NPL	National Priorities List
O&M	Operations and Maintenance
PAH	Polynuclear aromatic hydrocarbon
POP	Project Operations Plan
ppb	parts per billion
ppm	parts per million
PRP	Potentially Responsible Party
RAG	Remedial Action Guideline
RAO	Remedial Action Objective

ACRONYMS (Cont'd)

RfDs	USEPA Risk Reference Doses
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RMCL	Recommended maximum concentration level
RRA	Rural residential and agricultural
RRDZ	Royal River Discharge Zone
SDWA	Safe Drinking Water Act
Site	McKin Company Superfund Site
SOW	Statement of Work (appended to Consent Decree)
SP	Settling Parties
SWQC	State Water Quality Criteria
TBC	To be Considered
TCA	Trichloroethane
TCE	Trichloroethene
TtNUS	Tetra Tech NUS, Inc.
µg/L	micrograms per liter
USGS	United States Geological Survey
VOC	volatile organic compound

A five-year review was performed for the McKin Site in Gray, Maine. The five-year review is required by CERCLA when hazardous waste is left onsite above levels that allow for unlimited use and unrestricted exposure. The purpose of the five-year review is to assess whether the remedy selected for the Site remains protective of human health and the environment. This is the third five-year review for this site.

The McKin Site was operated as a collection and transfer station and disposal facility for waste oil and industrial process waste from 1965-1977. In 1978, sixteen private wells were capped due to VOC contamination, and the town's public water system was extended to East Gray. Between 1979 and 1983, the MEDEP conducted a removal of liquid wastes, drums, solid materials and soil. A ROD was signed in 1985 that included an onsite component for treatment of contaminated soil and an off-site groundwater treatment component. The remedy included thermal treatment of soils, drum disposal, construction of a groundwater extraction, treatment and surface water discharge system (GETS), off-site groundwater monitoring, and site closure activities. In 1987, the Potentially Responsible Parties (PRPs) submitted a site remediation and closure report to EPA and MEDEP which summarized the soil remedy and site closure. The on-site remedial action was completed with the submittal of these reports.

The GETS was constructed in 1990, and consisted of four extraction wells with a central treatment system and on-site reinjection of treated water. A 1993 PRP contractor report evaluated the expansion of the GETS east of Mayall Road and concluded that an expansion of the GETS was not technically practicable. The PRP contractor then submitted a Technical Impracticability Evaluation Report. The EPA and MEDEP approved the temporary shutdown of the GETS in October 1995 while the effectiveness of the system and alternatives could be evaluated. The agencies and PRPs were unable to reach a consensus regarding groundwater restoration, so in 1997, the EPA, MEDEP, the PRPs, the Town of Gray and other interested parties entered into a mediation process. The result was an amendment to the ROD in 2001, modifying the groundwater remedy to overlapping institutional controls and long-term monitoring. This amendment was made with the understanding of all the parties that the restoration timeframe of the groundwater through natural processes was estimated to be 50 years.

The institutional controls included a town ordinance to prevent use of the groundwater within the Institutional Control Zone (ICZ). There are currently 124 properties within the ICZ. Other institutional controls included restrictive covenants for 19 sub-dividable properties to prevent the use of groundwater on these properties, conservation easements for two properties to protect against future development along sections of Collyer Brook and the Royal River, and two separate agreements between the Settling Parties and the Town of Gray and the Gray Water District. The long-term monitoring portion of the modified remedy included additional monitoring, installation of wells along the interpreted perimeter of the plume, data evaluation to confirm decreasing TCE concentrations, and a refinement of the estimated timeframe to meet federal and state standards. The modified remedy also included an engineered cover for the "Boiling Springs" area, which was completed in September 2000.

The Town of Gray adopted a Groundwater Ordinance on January 22, 2002, to prohibit the use of groundwater within the ICZ. The 19 property owners have signed restrictive covenants for their properties and two property owners have signed conservation easements for their properties that border Collyer Brook and the Royal River. Surface water and groundwater monitoring is conducted by the PRPs in accordance with the long-term monitoring plan.

According to data reviewed, observations from the site inspection, and interviews, the remedies have generally been implemented in accordance with the requirements of the 1985 ROD and 2001 ROD Amendment. The source control portion of the remedy is complete. Groundwater and surface water monitoring continue in accordance with the long-term monitoring plan (LTMP) as specified in the ROD Amendment. Implementation of institutional controls has thus far ensured the integrity of the remedial measures conducted at the Site, and prevented exposure to Site contaminants contained in soils and groundwater. All homes within the ICZ are supplied with water from the Gray Water District. A new series of wells (900-series wells) to provide assurance regarding the lateral extent of the groundwater contamination have not been installed and institutional controls on the McKin property have not yet been obtained.

Five-Year Review Protectiveness Statement:

The remedies are expected to be protective of human health and the environment upon completion. The Site soil remedy was completed in 1987 and remains protective. Site groundwater is projected to reach federal and state guidelines within the next 50 years. In the

interim, exposure pathways that could result in unacceptable risks are being controlled and institutional controls are preventing exposure to, or the ingestion of, contaminated site groundwater. Long-term protectiveness of the remedial action will be verified by the collection and analysis of groundwater and surface water samples during long-term monitoring. Current data indicates that the plume is not expanding. Installation of the 900-series wells would provide greater certainty that the conceptual understanding of the extent of contamination is correct and would increase confidence that the ICZ boundaries are appropriate. The available data and analysis indicate that the remedy is functioning as required to achieve Site performance standards.

EPA has recently released a draft guidance document dealing with the vapor intrusion pathway. Based on the screening process presented in this guidance, there is insufficient site data to rule out the applicability of this exposure pathway. Additional work, and possibly ongoing monitoring, will likely be needed to ensure that there is no threat to indoor air quality from VOC vapors.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name <i>(from WasteLAN)</i> : McKin Company		
EPA ID <i>(from WasteLAN)</i> : MED980524078		
Region: 1	State: ME	City/County: Cumberland
SITE STATUS		
NPL status: Final		
Remediation status (choose all that apply): Completed		
Multiple OUs?* Yes	Construction completion date: OU1 – 1987/OU2 - 2001	
Has site been put into reuse? No		
REVIEW STATUS		
Lead agency: EPA		
Author name: Terrence Connelly		
Author title: Remedial Project Manager	Author affiliation: EPA Region I	
Review period: 4/13/03 to 9/30/03		
Date(s) of site inspection: 6/11/03		
Type of review: Post-SARA		
Review number: 3 (third)		
Triggering action: Award of remedial action contract – 3/16/87 Completion of last review – 9/30/98		
Triggering action date <i>(from WasteLAN)</i> : <u>3/16/87</u>		
Due date <i>(five years after triggering action date)</i> : <u>3/16/92 **</u>		

* "OU" refers to operable unit.

** Prior reviews were completed 9/22/92 and 9/30/98

Five-Year Review Summary Form, cont'd.

Issues:

- Regression analysis of groundwater data is not routinely updated.
- Reassess potential indoor air quality threat.
- Compliance with RAWP schedule for required elements.
- Restrictive covenant for the McKin property.
- 900-series wells not installed.
- EPA review of CSFs and RfDs for TCE.

Recommendations and Follow-up Actions:

- Update regression analysis of groundwater during every five-year review.
- Evaluate indoor air risk based on current state standards and federal guidance.
- Ensure schedule in RAWP, IV. 2, is adhered to for all uncompleted elements.
- Continue good faith effort to obtain a restrictive covenant for the McKin property.
- Increase efforts to obtain access agreements.
- After new TCE values are published, recalculate risk in the subsequent five-year review.

Protectiveness Statement(s):

The remedies are expected to be protective of human health and the environment upon completion. The Site soil remedy was completed in 1987 and remains protective. Site groundwater is projected to reach federal and state guidelines within the next 50 years. In the interim, exposure pathways that could result in unacceptable risks are being controlled and institutional controls are preventing exposure to, or the ingestion of, contaminated site groundwater.

Long-term protectiveness of the remedial action will be verified by the collection and analysis of groundwater and surface water samples during long-term monitoring. Current data indicates that TCE concentrations are decreasing and the plume is not expanding. Installation of the 900-series wells would provide greater certainty that the conceptual understanding of the extent of contamination is correct and would increase confidence that the ICZ boundaries are appropriate. The available data and analysis indicate that the remedy is functioning as required to achieve Site performance standards.

EPA has recently released a draft guidance document dealing with the vapor intrusion pathway. Based on the screening process presented in this guidance, there is insufficient site data to rule out the applicability of this exposure pathway. Additional work, and possibly ongoing monitoring, will likely be needed to ensure that there is no threat to indoor air quality from VOC vapors.

The five-year review is required since hazardous contamination remains at the Site above levels that allow for unlimited use and unrestricted exposure.

EPA has conducted this five-year review of the remedial actions implemented at the McKin Company Site in Gray, Maine. Tetra Tech NUS, Inc. (TtNUS) supported EPA in completion of the review under RACI Contract No. 68-W6-0045, W.A. No. 131-FRFE-0136. Assistance was provided by Maine Department of Environmental Protection (MEDEP). Work on this review was undertaken between April and September 2003. The review was completed in accordance with EPA Guidance OSWER NO. 9355.7-03B-P.

The purpose of this five-year review is to determine if the remedy selected for the McKin Company Site (Site) in Gray, Maine, remains protective of human health and the environment. This report summarizes the five-year review process, investigations and remedial actions undertaken at the Site; evaluates the monitoring data collected; reviews the Applicable or Relevant and Appropriate Requirements (ARARs) specified in the Record of Decision (ROD) for changes; discusses any issues identified during the review; and presents recommendations to address these issues.

The United States Environmental Protection Agency, Region 1 (EPA) prepared this five-year review pursuant to the Comprehensive Environmental Response Compensation, and Liability Act (CERCLA) §121 and the National Contingency Plan. CERCLA §121 states:

"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."

The EPA interpreted this requirement further in the National Contingency Plan; 40 CFR §300.430(f)(4)(ii) states:

"If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action."

This is the third five-year review for the McKin Company Site. The triggering action for this review was the award of the contract for the remedial action on March 16, 1987. Volatile organic compound (VOC) and petroleum-contaminated soils were treated on-site using soil aeration between July 1986 and April 1987. Construction of the groundwater extraction and treatment system (GETS) was completed in September 1990. The GETS operated from April 1991 until October 13, 1995.

2.0

SITE CHRONOLOGY

**TABLE 2-1
CHRONOLOGY OF SITE EVENTS
FIVE-YEAR REVIEW
MCKIN COMPANY SITE
GRAY, MAINE**

EVENT	DATE
The McKin Company began operations to store and dispose of liquid wastes.	1965
The facility was expanded. An asphalt-lined lagoon and incinerator were added.	1972
East Gray residents reported odors in well water and discoloration of laundry.	1973 – 1974
EPA confirmed contamination had impacted private wells.	1977
Town of Gray ordered the McKin Company to cease operations.	1977
Town of Gray issued an Emergency Health Ordinance placing a moratorium on new construction near the Site.	1977
Residents were connected to the extended public water system.	1978
The Maine Department of Environmental Protection (MEDEP) removed 33,500 gallons of wastes and 165 drums of oils and chemicals.	1979 – 1980
The MEDEP cleaned and removed the remaining above ground tanks.	1983
EPA and the MEDEP signed a Cooperative Agreement designating the Site as a state-lead cleanup.	1983
Interim Remedial Measure activities began, with MEDEP oversight.	August 1983
Final listing of the Site on the National Priorities List (NPL)	September 1, 1983
Potentially responsible parties (PRPs) completed the remedial investigation/feasibility study (RI/FS).	1985
Record of Decision (ROD) signed.	July 22, 1985
EPA issued an Administrative Order with two PRPs to conduct a soil aeration pilot study.	August 1985
MEDEP designated the Site an Uncontrolled Hazardous Substance Site.	November 1985
EPA and MEDEP issued an Administrative Order with 14 PRPs to conduct soil aeration treatment. VOC and petroleum-contaminated soils were excavated and treated on-site by soil aeration.	July 8, 1986 – April 17, 1987
Site demobilization and final closure completed.	June 23, 1987
"Soil Remediation and Site Closure Report" issued by the PRP's contractor.	July 1987

TABLE 2-1 (cont.)
 CHRONOLOGY OF SITE EVENTS
 FIVE-YEAR REVIEW
 MCKIN COMPANY SITE
 GRAY, MAINE
 PAGE 2 OF 3

EVENT	DATE
EPA, the State and over 320 PRPs signed a Consent Decree.	September 1987
Consent Decree entered in U.S. District Court, District of Maine.	November 21, 1988
PRP contractor submitted work plans for the groundwater cleanup.	December 1988
First Amendment to Attachment A to the Consent Decree signed.	October 1989
Agency approval of PRP contractor's "Hydrogeologic Investigation, DEP-8 Study Area Remediation and Pilot-Scale Treatability Study".	December 1989
Settling Parties (SP) submit "Groundwater Extraction and Treatment System Design Report".	December 1989
EPA issued an Explanation of Significant Differences, changing the method of treated groundwater discharge from surface water discharge to reinjection.	1990
Phase I groundwater extraction and treatment system (GETS) design approved by EPA and MEDEP.	June 1990
Second Amendment to Attachment A to the Consent Decree signed.	July 1990
GETS construction completed.	September 30, 1990
EPA certified the GETS as fully operational.	October 10, 1990
Phase I GETS operation official start date following completion of a treatability study.	April 15, 1991
PRPs submit "Revised Interim Groundwater Extraction and Treatment System Report".	October 1992
PRPs submit a report concluding that expansion of the GETS to the east side of Mayall Road would not restore the overburden aquifer within 200 years.	July 1993
EPA and MEDEP approved a temporary shutdown of the GETS.	October 1995
Third Amendment to Attachment A to the Consent Decree signed.	October 1995
PRPs submit a Technical Impracticability Evaluation.	October 31, 1995
PRPs submit a revised technical impracticability evaluation report.	March 1996

TABLE 2-1 (cont.)
 CHRONOLOGY OF SITE EVENTS
 FIVE-YEAR REVIEW
 MCKIN COMPANY SITE
 GRAY, MAINE
 PAGE 3 OF 3

EVENT	DATE
Due to significant disagreements between the agencies and PRPs regarding the site conceptual model and the relative contribution of water from the bedrock and overburden aquifers to the Royal River, the parties agreed to proceed with mediation.	January 15, 1997
Groundwater restoration mediation process (EPA, MEDEP, PRPs, Town of Gray, Gray Water District, citizen groups, and other interested parties).	June 1997 – November 1999
Focused field investigations by the EPA and the PRPs.	Winter/spring 1998
Boiling Springs cover installed.	September 2000
Memorandum of Understanding signed by EPA, MEDEP, PRPs, Town of Gray and Gray Water District.	November 2000
ROD amended.	March 2001
PRPs transmit approved Long-Term Monitoring Plan to EPA and MEDEP.	April 25, 2001
Amendment to Consent Decree entered into U.S. District Court.	December 7, 2001
GETS permanently shut down.	December 7, 2001
Gray Groundwater Ordinance adopted.	January 22, 2002
Conservation Easements recorded.	January 2002
RP Project Operations Plan for LTMP approved by the agencies.	October 2002
MEDEP received recorded copies of the 19 Restrictive Covenants, signed by the property owners in early 2001.	June 25, 2003
PRPs complete residential well abandonment plan.	TBD
Installation of 900-series monitoring wells by the PRPs.	TBD
Operations and maintenance (O&M), final closure activities commence.	Approx. 2007 but no later than 2011

Source: EPA, 2001a; 2001b.

3.0 BACKGROUND

3.1 Physical Characteristics

The McKin Superfund Site (Site) is located in Gray, Maine, approximately 15 miles north of Portland, Maine (Figure 3-1). The McKin property comprises an area of approximately 7 acres located on the west side of Mayall Road. The Site is composed of areas both presently and potentially impacted by contamination from the McKin property, and is bounded roughly as follows (see Figure 3-2):

- On the south by Yarmouth Road from Depot Road to Mayall Road and a line from the southern terminus of Mayall Road running east to the Royal River;
- On the east by the Royal River;
- On the north by Collyer Brook; and
- On the west by a line from the intersection of Collyer Brook with Merrill Road and closing at the intersection of Depot Road and Yarmouth Road.

Based on observed contaminant distribution, the Site also extends north of Collyer Brook at its confluence with Royal River, and east just beyond the Royal River at the river bend due east of the McKin property. In total, the Site consists of approximately 660 acres of residential, farm and wooded properties (TtNUS, 1999).

The topography of the McKin property has been modified by past excavations; the fenced enclosure was formerly a gravel pit with steep slopes on the west, south, and north sides. At-grade access to the property is from Mayall Road. The topography between the Site and the Royal River ranges from 300 feet above mean sea level (MSL) at the McKin property to approximately 90 feet MSL at the flood plain of the Royal River, a horizontal distance of about 3,700 feet. The topography west of the McKin property, in the Depot Road vicinity is relatively flat. East of Mayall Road, the land slopes downward to the floodplain of the Royal River. The floodplain where contaminated groundwater discharges to the Royal River (Royal River Discharge Zone (RRDZ), see Section 4.2.2), is a fairly level area extending 70 -100 feet from the banks of the river. Flooding of this area occurs in winter, early spring, and summer



MAP FROM USGS QUADRANGLE SHEET FOR GRAY, MAINE, EDITED IN 1980 (NE/4 GRAY 15' QUADRANGLE).



QUADRANGLE LOCATION

SITE LOCATION

FIVE-YEAR REVIEW

McKIN SITE - GRAY, MAINE

DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	P. CALL	DATE:	SEPTEMBER 4, 2003
SCALE:	NONE	ACAD NAME:	DWG\7613\0800\FIG_3-1.DWG

FIGURE 3-1



TETRA TECH NUS, INC.

55 Jonspin Road

Wilmington, MA 01887

(978)658-7899

RI031063F

3-2

Tetra Tech NUS, Inc.

Originals in color.

months following periods of heavy rainfall. Wetland areas are interspersed in the floodplain in eroded channels and depressions (EPA, 2001). The land surface is dissected by a number of small unnamed streams, and associated gullies. The resulting topography is frequently very steep, and access can be difficult.

The surficial geology of the Site includes both fine- and coarse-grained glaciomarine deposits, flood plain alluvium, and glacial till (EPA, 2001). The McKin property is located near the eastern edge of the East Gray glaciomarine delta which is composed of layered sand and gravel. The coarse-grained sediments consist of sand and gravel that range from 0 to 60 feet in thickness, and grade into glaciomarine fine sand, silt, and clay (Presumpscot Formation). The Presumpscot Formation occurs primarily below an elevation of 240 feet and ranges from 0 to 100 feet in thickness. Underlying the Presumpscot Formation are coarse-grained glaciomarine deposits of fine to coarse sand that range from 10 to 60 feet in thickness west of the buried bedrock valley and range from 87 feet at the RRDZ to 180 feet in the bedrock valley (TtNUS, 1999b). Alluvial deposits occur further east, along the floodplain of the Royal River, Collyer Brook, and the unnamed tributary that enters the Royal River upstream of the railroad trestle. The alluvial deposits consist of silt, sand, gravel, and widely disseminated organic matter.

Glacial till occurs along hillsides west of the McKin property above an elevation of 320 feet and beneath glaciomarine sediments on top of bedrock. According to boring logs from the McKin property, glacial till consists of silty sand and gravel. The glacial till is present up to 20 feet in thickness and is thin or absent at lower elevations (TtNUS, 1999b). Glacial till occurs between the coarse-grained glaciomarine upper layer and the bedrock (EPA, 2001).

The former McKin facility appears to be situated on a relative bedrock high point, with bedrock sloping downward both to the north and to the east (available data extend only a short distance to the south and west). Bedrock at the Site is identified as a granite of the Sebago Pluton. The bedrock is found at a depth of 50 to 100 feet at the eastern edge of the glaciomarine delta and increases to almost 200 feet depth near the Royal River (EPA, 2001). A single bedrock outcrop has been identified approximately 800 feet southeast of the former McKin facility, in the bed of an unnamed tributary to the Royal River. Core samples indicate that bedrock is generally fractured, but competent (unweathered). A bedrock trough runs from the junction of Mayall and Depot Roads southeasterly toward the Royal River. A second trough, located west of the Royal River, trends in a southerly direction (EPA, 2001). TCE concentrations in certain monitoring

wells (e.g. GWD-2) suggest groundwater from the McKin property is transported via bedrock fractures in a east-northeast direction (TtNUS, 1999b).

Groundwater occurs in overburden and bedrock beneath the localized perched groundwater system, largely unconnected to the regional aquifer due to the underlying low permeability deposits of the Presumpscot Formation. The regional groundwater system consists of both overburden and bedrock aquifers. Groundwater in the regional aquifers beneath the Site generally flows eastward and discharges to the Royal River. The groundwater in the overburden aquifer flows north, then shifts east toward the Royal River, near the intersection of Depot and Mayall Roads. There is also a component of flow in a north-northeast direction toward Collyer Brook (EPA, 2001).

Groundwater from the overburden aquifer downgradient of the Site discharges through a 400 to 600 foot reach of the Royal River in the RRDZ between Boiling Springs and the railroad trestle (EPA, 2001). Historic piezometric data show a change in groundwater elevation of about 200 feet from an area southwest of the McKin facility to an area near the pipeline right-of-way and the Royal River (see Figure 3-2). Groundwater is recharged by infiltration of precipitation above an elevation of 240 feet and by leakage from the Presumpscot Formation. The direction of groundwater flow is generally from west to east toward the Royal River. Vertical upward gradients along the Royal River, and the presence of contaminants in the river that are the same as those in the groundwater plume, indicate groundwater from the Site discharges to the Royal River (TtNUS, 1999b).

3.2 Land and Resource Use

The McKin Company property encompasses approximately 7 acres; approximately 4.5 acres are cleared, and the remainder is wooded. The property is located in the eastern, rural part of Gray, Maine and is about 15 miles north of Portland, Maine and the Atlantic Ocean (EPA, 1985). Properties contiguous to the McKin property include residential areas, wooded areas, and farmland (EPA, 1985). The nearest residences are immediately north and west of the McKin property; the closest home is approximately 200 feet from the McKin property (EPA, 1985). Private water supply wells used the bedrock aquifer north of the McKin property until the wells were contaminated in the 1970s. The site vicinity is generally rural. According to the 2000 census, the population of the Town of Gray was 6,839. The population of the Town of Gray has

increased approximately 15 percent between 1990 and 2000 and is forecast to increase approximately 11 percent between 2000 and 2010 according to the Maine State Planning Office.

The Site, as defined by the area impacted by contamination from the facility operations, extends to Collyer Brook and the floodplain of the Royal River. The portion of Collyer Brook within the boundaries of the Site is shown on the flood insurance rate map (FIRM) as Zone A, or the 100-year flood boundary (FEMA, 1982). The reaches of the Royal River within the Site boundaries are also within the 100-year floodplain, including the area of Boiling Springs (FEMA, 1982). There are also two small Zone B, or 500-year floodplain, areas near the confluence of Collyer Brook and the Royal River. The McKin property and most of the residential, wooded and farmland areas within the Site are well above the base flood elevations. The Royal River is classified as a state Class B waterway, which includes the following designated uses: recreation in and on the water; fishing; drinking water supply after treatment; fish and other aquatic life habitat; navigation; industrial process and cooling water supply; and hydroelectric power generation, as specified (CMR 38:465,3) .

A review of the current Town of Gray zoning map located in the Gray Town Offices indicated that the McKin facility proper and most of the area around the Site is zoned as a Rural Residential and Agricultural (RRA) district. The RRA district covers those areas of Gray that are the most sparsely populated and rural. The RRA zoning regulations emphasize low density development to retain and enhance the existing rural and open space environment in the district (Gray Zoning Regulations, Section 402.20). There is also an Aquifer Overlay Zone (AOZ) with requirements in addition to the underlying zoning (e.g. RRA). Any land use, construction of any type, etc. must adhere to the AOZ regulations, including permitted and allowable uses and prohibited activities, to protect groundwater resources and preserve the resource for present and future use (Gray Zoning Regulations, Section 402.23).

One of the outcomes of the 1997 to 1999 mediation process was the adoption of a groundwater ordinance by the town. The Groundwater Ordinance of the Town of Gray, Maine, Chapter 404, was adopted January 22, 2002, to protect the health, safety and general welfare of residents via an Institutional Control Zone (ICZ) and also prohibit the removal and any use of groundwater from areas within the ICZ. The ICZ currently includes 124 properties. The prohibition on

groundwater use is intended to prevent exposure to contaminated groundwater until the groundwater attains Maine drinking water standards.

An ecological investigation conducted in 1998 concluded that no known occurrences of federal or state-listed threatened or endangered species have been recorded in the vicinity of the Site. (TtNUS, 1999). Based on currently available information, this conclusion remains accurate.

3.3 History of Contamination

The McKin facility was operated from 1965 to 1977 as a collection and transfer station and disposal facility for waste oil and industrial process waste. In 1972, the facility was expanded with the addition of an asphalt-lined lagoon and incinerator to process a large volume of oily waste from an oil spill in Hussey Sound (a shipping channel leading into Portland harbor). The incinerator operated under a permit from MEDEP until operations ceased about 1973 (EPA, 1985). Most of the oily wastes were stored in the on-site lagoon. This lagoon reportedly leaked and discharged portions of its contents to the subsurface. The facility reportedly handled an estimated 100,000 to 200,000 gallons of waste annually between 1972 and 1977.

During 1973 and 1974, local residents reported chemical odors in their well water and discoloration of their laundry. Investigations subsequently found solvents in site soils and groundwater. VOCs from the facility contaminated local residential wells through migrating groundwater. In 1977, the solvents were identified as trichloroethene (TCE) and 1,1,1-trichloroethane (TCA), and the Town of Gray ordered the McKin Company to cease operations.

3.4 Initial Response

In December 1977, 16 private water supply wells were capped and water was trucked in on an emergency basis. In 1978, residents were connected to the public water system which had by then been extended to the eastern part of Gray.

During the summer of 1979, MEDEP removed 33,500 gallons of liquid waste from the McKin property. MEDEP entered into a cooperative agreement with EPA in June 1983 to implement initial remedial measures and conduct an RI/FS. During 1983, MEDEP removed 69 drums of solidified sludge, 18 cubic yards of solid materials, and 10,500 cubic yards of soil from the

property. These activities were undertaken to remove potential sources of contamination from the Site. The Site was placed on the NPL on September 1, 1983.

3.5 Basis for Taking Action

In 1984, a RI/FS was begun; the RI was completed in February 1985 and the FS in March 1985. The RI identified specific areas of soil contamination on the McKin property as the source of groundwater contamination. Groundwater contamination in both the surficial and bedrock aquifers was also identified in the RI. The FS evaluated a number of on-site source control alternatives and groundwater control alternatives.

Soil contaminants identified on the McKin property included VOCs and heavy metals. The heavy metal concentrations were within the range typically found in soils (EPA, 1985). Three areas contained soil contaminants typical of oil disposal operations, e.g. constituents of petroleum. Three other areas were heavily contaminated with VOCs including: TCE at 1,400 milligrams per kilogram (mg/kg) and 1500 mg/kg; methylene chloride at 49 mg/kg; xylenes at 21 mg/kg; 1,1,1-TCA at 4.5 mg/kg; dichlorobenzene at 9.2 mg/kg; and other contaminants (EPA, 1985).

Contaminants were released to the subsurface at the McKin property. As a result of precipitation-driven groundwater flow, and influenced by the pumping of the residential bedrock wells, contaminated groundwater migrated to the regional aquifer discharge area at the Royal River. The major VOCs found in the surficial aquifer groundwater were TCE and 1,1,1-TCA at concentrations of 16,000 parts per billion (ppb) and 170 ppb, respectively. Concentrations of the two contaminants were 29,000 ppb and 500 ppb, respectively, in the bedrock aquifer (EPA, 1985). Concentrations of TCE and 1,1,1-TCA were below a 1 ppb detection limit in Collyer Brook and the Royal River. Both VOCs were detected at Boiling Springs at maximum concentrations of 44 ppb TCE and 30 ppb 1,1,1-TCA (EPA, 1985).

The risk assessment completed as part of the RI concluded that there was no significant health risk from surface water or soils on the McKin property. Air monitoring on the property indicated no exceedances of state guidelines for ambient air. However, the contaminated soils on the property were considered a source of contaminants that impacted the off-site aquifers, which are potential drinking water sources. The public health risk was considered "potential" because

there were no known users of the groundwater as a drinking water supply (due to the availability of municipal water), and because the contamination may restrict future use of the aquifer. TCE concentrations exceeded the guideline level of 10^{-5} lifetime risk of cancer, or 28 ppb, at most of the monitoring wells sampled. The risk assessment concluded that at the concentrations found, there was a public health risk associated with long term consumption of groundwater (EPA, 1985).

4.0 REMEDIAL ACTIONS

This section describes the remedial actions selected for and implemented at the Site.

4.1 Remedy Selection (1985 ROD)

The following remedial action objectives (RAOs) were used to evaluate alternatives in the FS:

- Maintain adequate safe drinking water for the public potentially impacted by groundwater contamination;
- Prevent exposure of the public to harmful airborne contaminants;
- Prevent contact by the public with contaminated soils by dermal or ingestion routes;
- Prevent subsurface discharge of contaminated groundwater from the McKin property to off-site aquifers;
- Restore, within a reasonable time and practical limits, the off-site aquifer contaminated by McKin operations to levels acceptable for drinking water supply and protective of the environment; and
- Protect Royal River state-designated uses and aquatic life.

The 1985 ROD included an on-site component for treatment of contaminated soil and an off-site groundwater treatment component. The remedy presented in the 1985 ROD included:

- On-site soil aeration of soils from identified areas on the property;
- Disposal of approximately 16 drums off-site;
- Soil testing in the petroleum contaminated areas;
- Construction of a groundwater extraction, treatment, and surface water discharge system (GETS) and operation of this system for a period of 5 years to achieve groundwater performance standards of 92 ppb 1,1,1-TCA and 28 ppb TCE;
- Re-evaluation of the groundwater performance standards if the standards were not met within 5 years;
- Initiation of an off-site groundwater and surface water monitoring program; and
- Building demolition, clearing debris, removing drums and other materials, and other site closure activities.

Source area soil aeration was selected to “actively and significantly” reduce the amount of contamination that remained on the McKin property (EPA, 1985). The performance standard for the remedy was a soil concentration of 0.1 mg/kg TCE, averaged over the volume of treated soils, to ensure off-site groundwater concentrations that would be protective of human health as drinking water. The ROD specified that areas of the property contaminated with petroleum derivatives would be tested further during the remedial design to determine an appropriate remedial action.

The remedial action objective for off-site groundwater as stated in the 1985 ROD was to restore the off-site aquifer to levels protective of human health and the environment within practical limits and a reasonable amount of time. The ROD required surface water discharge for treated groundwater. Performance standards were established with the expectation that they could be achieved within the planned five-year period of operation of the off-site groundwater remedy. The performance standards of 92 ppb 1,1,1-TCA and 28 ppb TCE were applicable throughout the impacted area, or McKin Site, and were established based on the protection of human health and the environment with consideration given to potential exposures and possible synergistic and additive effects (EPA, 1985). As a suspected carcinogen, the TCE standard was based on a 10^{-5} lifetime cancer risk value. The 1,1,1-TCA performance standard was based on a recommended maximum concentration level (RMCL) of 200 ppb, adjusted to 92 ppb based on possible synergistic and additive effects with TCE.

4.2 Remedy Implementation (1985 ROD)

This section describes the implementation of the source control and groundwater remedies specified in the 1985 ROD.

4.2.1 On-Site Source Control Remedy

During 1986, a group of private companies, the PRPs, voluntarily undertook a remedial action at the Site to excavate and treat VOC-impacted soil to minimize continued migration of VOCs to groundwater. Approximately 12,000 cubic yards of soils containing solvents and petroleum were excavated and treated by soil aeration between July 1986 and April 1987. Approximately 9,500 cubic yards of VOC-contaminated soils were treated and met the 0.1 mg/kg TCE treatment performance standard between July 1986 and February 1987. VOC-contaminated

soils were excavated outward from the identified source areas until TCE concentrations were below 1 mg/kg, the soil excavation performance standard. Between November 1986 and April 1987, approximately 2,500 cubic yards of petroleum-contaminated soils were excavated to a 1 mg/kg polynuclear aromatic hydrocarbon (PAH) and total extractable hydrocarbons performance standard and treated in the same manner. The treated soil was then stabilized using cement and replaced in the excavation. The entire property was sloped, graded, loamed, and hydroseeded.

The 1985 ROD included fencing the Site, and posting appropriate warning signs as an element of the specified site removal and closure activities. The Settling Parties submitted site remediation and closure reports to EPA and MEDEP in 1987 summarizing the results of the soil aeration remedy for the VOC and petroleum areas specified in the 1985 ROD. The submittal of these reports was required under the 1988 Consent Decree. The soil remedial action was completed with the submittal of these reports. Completion of this remedy achieved the second and third RAOs listed in Section 4.1.

As required by the 1988 Consent Decree, the Settling Parties (SPs) performed a site characterization of the Well DEP-8 area. The nature and extent of contamination in the vicinity of Well DEP-8, located east of the former lagoon, was determined and a remedial action performed in these petroleum-contaminated areas. This element of the Consent Decree was completed with the submittal and approval of a December 1989 "Hydrogeologic Investigation, DEP-8 Study Area Remediation and Pilot-Scale Treatability Study" and an August 20, 1990, "DEP-8 Soil Confirmation Project Summary" (EPA, 2001b).

4.2.2 Off-Site Groundwater Remedy

The 1985 ROD stated that the three RAOs for the off-site groundwater remedy would be achieved by the design, construction and operation of a groundwater extraction and treatment system (GETS) to remove VOCs from the overburden aquifer and restore overburden groundwater to the established performance standards. The cost estimate in the ROD for the off-site groundwater remedy assumed installation of 25 extraction wells and a 5-year restoration time frame. In 1990, an Explanation of Significant Differences (ESD) was approved by EPA that changed the method of treated groundwater discharge from surface water discharge to groundwater reinjection through infiltration galleries, to aid in flushing the VOCs from the

subsurface. Additionally, EPA and the MEDEP agreed in 1990 to a phased approach to groundwater remediation beginning with a limited four extraction well system near the Site. The GETS also included quarterly groundwater and surface water monitoring for VOCs. Following an evaluation of the effectiveness of the first phase, a decision to expand the system (e.g. the next phase) to the east side of Mayall Road would be made.

In 1990, the GETS, consisting of four extraction wells and a central treatment system, was installed on the McKin Site. The four extraction wells were located approximately 500 to 1,000 feet north of the McKin property on the western side of Mayall Road (see Figure 3-2). Two infiltration galleries were located in the central and northern areas of the McKin property to reinject treated groundwater.

Groundwater contamination was migrating from the McKin property in two plumes, an eastern and a northern plume. One of the four extraction wells, placed in the main, or eastern, plume (EW-503), was designed with a projected flow of 20 gpm. The well was installed in soils with a limited saturated overburden thickness that yielded only 1-2 gpm (EPA, 2001a). As a result, the GETS was not effective in extracting VOCs that were migrating in the eastern plume from the McKin property to the Royal River. The expected flushing of VOCs through the use of infiltration galleries did not appear to affect the monitoring wells placed in the northern TCE plume. This observation suggested that pumping the residential wells in the 1970s, historic lagoon operations, and TCE transport through bedrock fractures, may have contributed to the northern plume (SME, 1999).

In July 1993, the PRPs submitted a report evaluating an expansion of the GETS east of Mayall Road and concluded that groundwater restoration was not technically practicable. In late 1995, the agencies agreed to allow the PRPs to submit a Technical Impracticability Evaluation Report in place of the 56-month report required under the Consent Decree. Groundwater data indicated the likely presence of dense non-aqueous phase liquids (DNAPL) in bedrock and overburden aquifers (EPA, 2001). The presence of residual DNAPL in low permeable strata may act as a continuing source of VOCs that may desorb, dissolve in the groundwater, and be carried to more permeable units. The EPA and the MEDEP approved a temporary shutdown of the system in October 1995 so the parties could evaluate the effectiveness of the system and alternatives for the Site's cleanup. This evaluation included an assessment of the feasibility and cost of groundwater restoration, containment, mitigation, and institutional controls. During the

period of operation, from April 1991 to October 1995, the GETS removed approximately 26 gallons of TCE (SME, 1999).

After two revisions to the Technical Impracticability Evaluation, the agencies and the PRPs were unable to reach a consensus regarding the site conceptual model. The principal disagreements were the relative flow through the overburden and bedrock aquifers and the extent of the contamination plume discharge zone. In the spring of 1997, EPA, MEDEP, the PRPs, the Town of Gray, and other interested parties, entered into a mediation process to determine the future direction for the Site. In 1998, EPA performed an investigation of the Royal River Discharge Zone (RRDZ) to evaluate alternatives to intercept the groundwater plume that discharges to the Royal River and thus meet the State Water Quality Criteria (SWQC) for the river. During the same period, the PRPs completed an investigation of the overburden aquifer in the Gray Depot area, around the intersection of Depot Road and the Maine Central Railroad. These studies were used in the development of recommendations by the mediation group. The mediation effort reached a consensus in November 1999 leading to a ROD amendment for the off-site groundwater remedy.

4.3 ROD Amendment – Off-Site Groundwater

The March 2001 ROD Amendment modified the groundwater remedy from active restoration to a remedy consisting of overlapping institutional controls and long-term monitoring. Based on the 50-year time frame for restoration of the aquifers developed from extrapolations of monitoring data, performed as part of the mediation process, EPA concluded that it was technically impracticable to achieve MCLs in the plume within a reasonable time frame (EPA, 2001).

4.3.1 Description of the Modified Remedy

The off-site groundwater remedy change replaced the two groundwater RAOs in the 1985 ROD (see Section 4.1) with the following four activities (EPA, 2001a):

1. Develop a set of institutional controls to prevent exposure to contaminated groundwater;
2. Monitor groundwater to show that the contaminant plume does not expand and that contaminant concentrations continue to decline due to natural processes;

3. Monitor surface water to show decreases in TCE concentrations in the Royal River resulting from decreases in groundwater concentrations. A contingency response approach would be implemented if TCE exceeds the SWQC at a specified location and date; and
4. Evaluate the remedy to assess that it is protective of human health and the environment.

An Institutional Control Zone (ICZ) was established during the mediation process, based on the horizontal area of the proposed Technical Impracticability Zone, extending vertically to deep bedrock. The ICZ boundaries include areas where groundwater is known or suspected to exceed federal maximum contaminant levels (MCLs) and state maximum exposure guidelines (MEGs) and areas where contaminated groundwater could migrate in the future. The ICZ was memorialized in an ordinance adopted by the Town of Gray on January 22, 2002. The ICZ currently encompasses 124 properties, including 19 sub-dividable properties whose water rights were purchased by the PRPs to prevent their use under an allocation developed by the property owners. This additional protection was included to alleviate the concern that future development and installation of wells could possibly alter the boundaries of the contaminant plume. The owners of these 19 properties signed restrictive covenants with EPA and MEDEP.

Two conservation easements were established to protect areas of open space with frontage along Collyer Brook and the Royal River. The PRPs were also required to make a good faith effort to procure a restrictive covenant for the McKin property.

Hydrogeologic studies have described the groundwater contaminant flow in two plumes. The eastern plume near the McKin property appears to flow from the overburden to the bedrock and then back to the overburden downgradient and near the Royal River (EPA, 2001a). The groundwater discharges to the Royal River through a 500 – 700 foot zone known as the Royal River Discharge Zone (RRDZ) (see Figure 3-2). The northern plume extends north of the McKin property and Depot Road and appears to attenuate in overburden prior to reaching Collyer Brook (EPA, 2001a). The information evaluated during the mediation process included groundwater quality data that indicated TCE concentrations decreasing in most monitoring wells. Attenuation rate projections of TCE in groundwater in the overburden and shallow bedrock indicated, for the most part, that drinking water quality standards would be achieved in different parts of the Site in 5 to 50 years (EPA, 2001a).

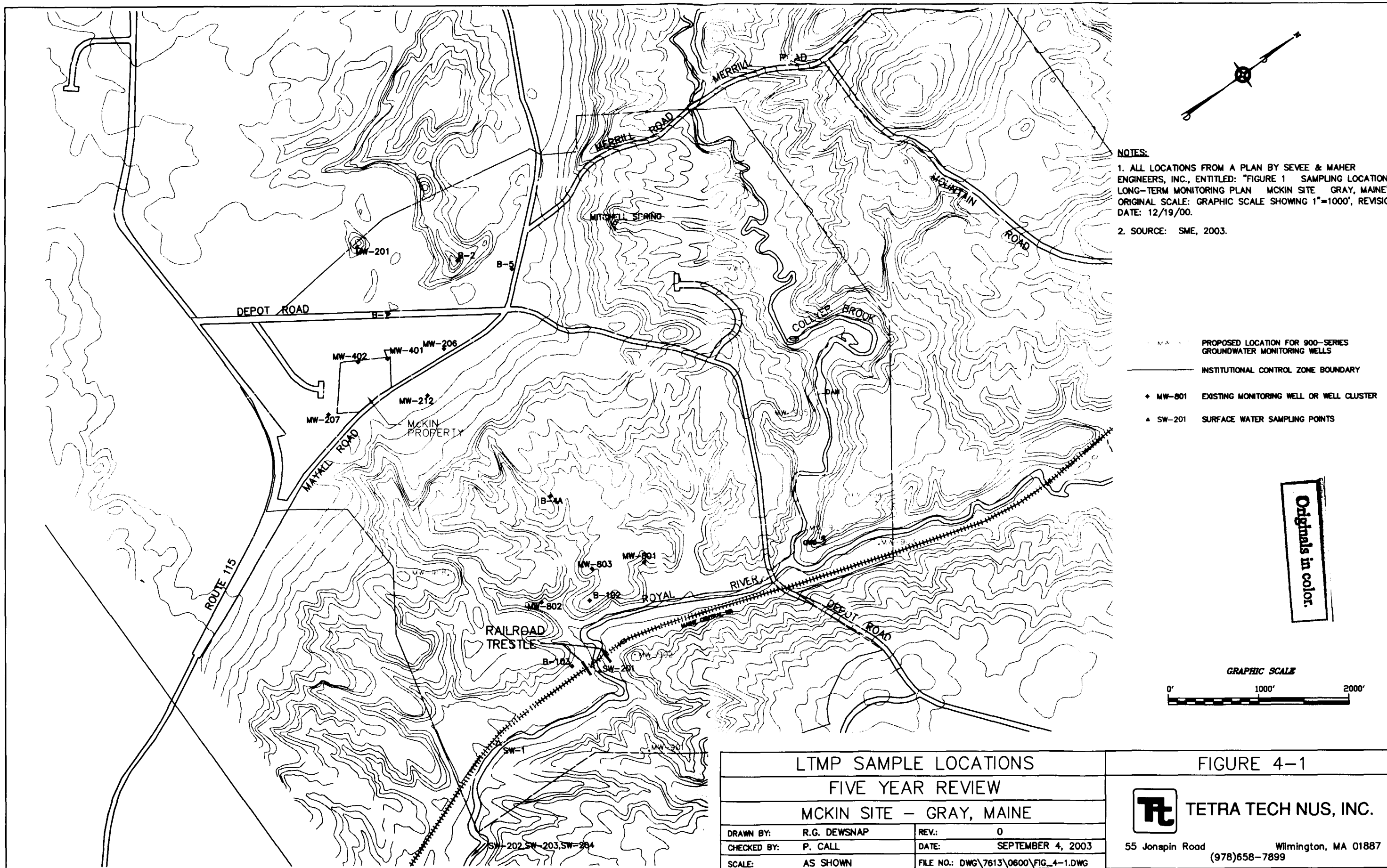
The groundwater aquifer and Boiling Springs, a depression adjacent to the Royal River where groundwater flows to the surface, are potential drinking water sources. TCE concentrations in both waters exceed the federal MCL of 5 micrograms per liter ($\mu\text{g/l}$) (EPA, 2001). EPA reviewed human health and environmental risk assessments and concluded that an unacceptable risk was associated with drinking water use of groundwater and Boiling Springs. The ROD Amendment specified the groundwater performance standards shown in the table below as well as any alternate concentration limits determined by EPA and MEDEP to protect public health.


Compound	Performance Standard
TCE	5 $\mu\text{g/L}$
1,1,1-TCA	200 $\mu\text{g/L}$
cis-1,2-dichloroethene	70 $\mu\text{g/L}$
1,1-dichloroethene	7 $\mu\text{g/L}$
tetrachloroethene	5 $\mu\text{g/L}$
vinyl chloride	0.15 $\mu\text{g/L}$

Source: EPA, 2001

The modified groundwater remedy includes a long-term groundwater monitoring program in addition to the overlapping institutional controls. The major components of the groundwater monitoring program are: installation of wells along the perimeter of the contaminant plume (see the 900 series wells on Figure 4-1); evaluation of the data to confirm TCE concentrations continue to decrease and the plume boundaries are not expanding; and a refinement of the estimated time to meet federal and state standards.

Prior to the 1985 ROD, TCE was detected in Boiling Springs but not in the Royal River. However, in 1989, TCE was detected in the Royal River. TCE concentrations increased until 1992 and then decreased, following the same pattern as the TCE concentrations in groundwater. Riverbed sampling performed by EPA and the U.S. Geological Survey (USGS) in 1997 showed that the majority of contaminated groundwater discharged into the Royal River along a 400 to 600 foot reach, the RRDZ. Projections developed during the mediation process predicted a continuing decrease in TCE concentrations in the Royal River and that SWQC levels would be reached in 6 to 8 years (EPA, 2001a).



LTMP SAMPLE LOCATIONS			FIGURE 4-1		
FIVE YEAR REVIEW			 TETRA TECH NUS, INC. 55 Jonspin Road Wilmington, MA 01887 (978)658-7899		
MCKIN SITE – GRAY, MAINE					
DRAWN BY:	R.G. DEWSNAP	REV.:			0
CHECKED BY:	P. CALL	DATE:			SEPTEMBER 4, 2003
SCALE:	AS SHOWN	FILE NO.:	DWG\7613\0600\FIG_4-1.DWG		

EPA's risk assessment concluded that surface water did not present an unacceptable human health or ecological risk, either currently or under a future potential drinking water source scenario. Therefore the 2001 ROD Amendment did not include any surface water remedial action (EPA, 2001a).

The amended remedy includes monitoring the Royal River to confirm continuing decreases in TCE concentrations. The SWQC for TCE is 2.7 ppb, based on human health for consumption of water and organisms (EPA, 2001a). Discharge of TCE in excess of the SWQC of 2.7 ppb is prohibited. If the established SWQC at a harmonic mean flow of 48 cfs or 0.32 kg/day, is not met by 2009 at SW-1, or 2013 at SW-201, the ROD Amendment includes a contingency response approach that will allow for active remediation. The contingency response will be funded by an insurance policy obtained by the PRPs and allows MEDEP to implement active remediation if the above-mentioned SWQC is not met (EPA, 2001). The amended remedy also included an engineered cover for the Boiling Springs area to prevent exposure to contaminated water by environmental receptors.

The final element of the amended remedy specifies continued reviews every five years to assess the protectiveness of the remedy. Each review will also evaluate site conditions to assess if changes in the plume warrant changes in the ICZ based on the available data and the goal of continued protectiveness of public health and the environment.

4.3.2 Implementation Status

The Amendment to the 1988 Consent Decree was signed in August 2001 and entered into the U.S. District Court on December 7, 2001. Once the amended Consent Decree became effective, the GETS was permanently shut down.

A Groundwater Ordinance was adopted by the Town of Gray on January 22, 2002, to prohibit the removal and use of groundwater from the properties located within the ICZ. The PRPs have purchased the water rights and prepared restrictive covenants prohibiting installation of wells on the 19 properties within the ICZ that can be sub-divided. Any future development on these 19 properties must be provided with municipal water supplied by the Gray Water District. These restrictive covenants have been signed by the property owners, EPA, MEDEP, and have been recorded in the Cumberland County Registry of Deeds (Swain, 2003). The Superintendent of

the Gray Water District confirmed that all homes within the ICZ are supplied with water from the Gray Water District. A water line is being installed in September 2003 within the ICZ to supply new homes on George Perley Road.

A pilot study was completed for the cover of Boiling Springs in September 2000. An engineered cover was installed that allows the springs to continue to discharge to the river, but eliminates exposure to contaminated water by environmental receptors. The bank of the river was rebuilt with a gabion wall and riprap and the disturbed floodplain area was graded, erosion control mats laid, and seed applied. The cover was monitored from October 2000 through the 2001 flood season to ensure the cover's stability.

The PRPs conduct routine groundwater and surface water monitoring in accordance with their long-term monitoring plan (LTMP). The LTMP, approved by the agencies in 2001, is attached to the revised Remedial Action Work Plan, Appendix A to the 2001 Amended Consent Decree. While the LTMP includes the 900 series wells to be installed in overburden and bedrock along Collyer Brook, the Royal River and the south side of the eastern plume, this series of wells (see Figure 3-3) has not yet been installed due to access issues. Groundwater monitoring currently includes the other existing monitoring wells specified in the LTMP. The monitoring data collected through 2002 appear to be tracking closely to the decrease in TCE concentrations and time frames predicted in the regression analysis prepared during the mediation process. These linear regressions indicated the time frames for attaining the groundwater and surface water goals, as 40-50 years and 5-7 years, respectively.

The PRP contractor indicated that groundwater monitoring well regressions are not routinely prepared as part of the LTMP data reports since the monitoring data appear to fit the anticipated linear regressions (Muzzey, 2003). The revised Remedial Action Work Plan, Appendix A to the 2001 Amended Consent Decree, requires review of the LTMP coincident with the five-year review, beginning with the next review.

The PRPs acquired two conservation easements, executed by MEDEP, on properties that border sections of Collyer Brook and the Royal River, and recorded by MEDEP in the Cumberland County Registry of Deeds in January 2002 (Hewett, 2003).

The PRPs have obtained the insurance policy required for the contingency response approach in the ROD Amendment, amended Consent Decree, and amended Remedial Action Work Plan (RAWP). The need for the insurance policy is tied to achievement of the Royal River SWQC by 2009 at SW-1 and by 2013 at SW-201 (EPA, 2001).

The Project Operations Plan (POP) states that a deed restriction will be obtained for the McKin property as part of decommissioning activities. This is also a requirement of the RAWP incorporated into the ROD Amendment (referred to in the RAWP as a restrictive covenant). The deed restriction would prohibit any excavation below grade or installation of wells for groundwater use without the approval of the MEDEP. According to the POP, if the property owner does not permit entering such a restriction on their deed, the agencies would need to intervene to require a deed restriction on the property (SME, 2003a). This deed restriction has not yet been obtained (Swain, 2003).

4.4 Operations and Maintenance

The 1985 ROD lists maintenance, such as mowing, as the only O&M activity for the on-site source control remedy. The cost of mowing the McKin property was estimated as \$1,600/yr. The POP states that the PRPs have performed maintenance activities the McKin property since 1986 (such as mowing, snow plowing, fence repair and routine building maintenance) (SME, 2003a). The PRP contractor indicated that mowing has not been necessary and thus has not been performed; the facility is plowed to provide access as necessary for monitoring activities (Muzzy, 2003). The 1985 ROD did not include any O&M for the off-property groundwater remedy based on the expectation that the remedy would either be completed, or would be reassessed, after five years of operation. Since the GETS is now permanently shut down, the only remaining activities associated with the groundwater remedy are decommissioning activities and implementation of the well abandonment plan. Both of these activities are described in the PRP contractor-prepared POP (SME, 2003a).

The fence, treatment building, a washdown concrete pad, and subsurface and above ground piping for the two infiltration galleries remain on-site. All of the above items either will be removed or the piping capped during decommissioning activities. The PRP contractor estimates that these activities will most likely occur in 2007, but no later than 2011 (SME, 2003a). Decommissioning activities will also include the removal of piezometers and monitoring

wells on the McKin property, with the exception of four wells (MW-401A, MW-401C, MW-402A, MW-402B) included in the long-term monitoring plan, and extraction wells, which will be abandoned within a year (SME, 2003a).

This is the third five-year review for the Site. The second five-year review completed by EPA in 1998 noted the following three issues, or threats, all of which have since been addressed in the 2001 ROD Amendment:

- Exposure to contaminated groundwater continued to be a threat to human health. At the time there was no prohibition against installation of water supply wells in the contaminated aquifer. Adequate institutional controls would be required to ensure protectiveness.
- A potential human health risk existed due to TCE discharges to the Royal River at concentrations exceeding the SWQC. Some combination of measures, such as active remediation and institutional controls, to prevent use of the river as a drinking water source would be required to ensure protectiveness.
- Sampling data from springs near the river and sediment in the RRDZ indicated a potential risk to environmental receptors.

Since the last five-year review was completed in 1998, the mediation process successfully concluded with an agreement by all parties to change the groundwater remedy from active restoration of the overburden and shallow bedrock aquifer to long-term monitoring and overlapping institutional controls. A ROD Amendment was completed in March 2001 and an amended Consent Decree was entered into U.S. District Court in December 2001. The ROD Amendment, which incorporated the agreements arrived at during the mediation process, included: implementation of a municipal groundwater use ordinance and acquisition of restrictive covenants on certain properties to prevent use of contaminated groundwater; installation of a new group of monitoring wells, the "900 series," generally at the perimeter of the TCE plumes; performance of a long-term groundwater and surface water monitoring program to track decreasing TCE concentrations; and installation of an engineered cover for Boiling Springs to eliminate the potential risk to environmental receptors.

The issues identified in the second five-year review have been addressed by the 2001 ROD Amendment. A number of elements outlined in the RAWP, Appendix A to the Amended McKin

Consent Decree, have not been implemented to date by the PRPs (See Section 8.0) The groundwater and surface water monitoring data continue to show declining concentrations of TCE.

6.0 FIVE-YEAR REVIEW PROCESS

6.1 Administrative Components

EPA, the lead agency for this five-year review, notified MEDEP and the PRPs in early 2003 that the five-year review would be completed. EPA issued a scope of work, WAF No. 131-FRFE-0136, to TtNUS, under EPA RAC1 contract 68-W6-0045, on April 13, 2003, to assist EPA in performing the five-year review. The EPA Work Assignment Manager and Remedial Project Manager was Terry Connelly. Rebecca Hewett, Denise Messier, and Hank Andolsek of the MEDEP were part of the review team.

The schedule established by EPA included completion of the review by September 2003.

6.2 Community Notification And Involvement

TtNUS prepared a public notice announcing the five-year review and requesting public participation. The public notice was provided to the Gray News and The Monument News, both of which published a news brief based on the information in the notice. In addition, on May 30, 2003, the EPA RPM sent letters to each of the 19 owners of properties with restrictive covenants notifying them of the five-year review and the June 11, 2003, site inspection. With the exception of discussions with property owners regarding access for the 900-series wells, there has been little participation or involvement from the local community since the conclusion of the mediation process in November 1999.

During visits to the Town of Gray Municipal Offices and the Gray Water District on June 11, 2003, representatives from TtNUS briefly described the five-year review process.

6.3 Document Review

This five-year review consisted of a review of relevant documents including decision documents and monitoring reports, as specified in the EPA Statement of Work for this review (See Appendix A).

6.4 Data Review

A review was completed of various PRP-contractor plans and monitoring reports. A summary of relevant data regarding the components of the Site remedy is presented below.

6.4.1 On-Site Source Control Remedy

The on-site remedy included excavation of approximately 12,000 cubic yards of VOC- and petroleum-contaminated soils from five locations and the former lagoon, and treatment via soil aeration. Soils were excavated outward until TCE concentrations were below 1 mg/kg, the performance standard set in the 1985 ROD for soil excavation of VOC-contaminated soils. After treatment by soil aeration and sampling to ensure the treated soils attained the ROD performance standard of 0.1 mg/kg, the soils were mixed into a slurry with water and cement and backfilled. Petroleum-contaminated soils from four areas of the facility were remediated in a similar manner. The extent of excavation was determined when the performance standard of 1 mg/kg of PAHs and total extractable hydrocarbons for petroleum-contaminated soils was reached. Soils sampled after treatment by soil aeration confirmed that the ROD-specified standards had been met. After the PRPs submitted the required soil remediation and site closure reports to the agencies in 1987, the remedy was considered completed.

6.4.2 Off-Site Groundwater Remedy

The historical water quality results indicate that most monitoring wells show a declining trend. Table 6-1 shows TCE data for wells in the eastern and northern plumes including: concentrations at first detection of TCE; concentrations in October 1991, soon after the GETS began operating in April 1991; concentrations after the GETS was temporarily shutdown in October 1995; TCE concentrations four years after the shutdown (November 1999); and the most recent data from the wells included in the PRP contractor's LTMP (August 2002). The August 2002 data shown as "NR" in the table either are not included in the LTMP, or were formerly included and are now in "inactive status."

The 2002 monthly surface water TCE concentrations at SW-1 and SW-201 correspond to loading rates ranging from 0.20 – 0.38 mg/day at SW-1 and 0.22 – 0.38 kg/day at SW-201

TABLE 6-1
TCE CONCENTRATIONS AT GROUNDWATER/SURFACE WATER SAMPLING LOCATIONS
FIVE-YEAR REVIEW
MCKIN COMPANY SITE
GRAY, MAINE

(all concentrations in parts per billion)

	Sample Location	First Detection (mo./yr conc.)	October 1991	October 1995	November 1999	August 2002
Eastern Plume Well Locations	MW-401A	(9/89) 910	170	6	16	13
	MW-401B	(9/89) 380	58	2.8	4.7	NR
	MW-401C	(9/89) 6100	530	63	13	120
	MW-403B	(8/90) 5 T	3 J	0.5 J	ND	NR
	MW-403C	(10/89) 34	100	4.4	ND	NR
	MW-212C	(9/89) 120	49	2.7	ND	<5
	MW-206A	(9/89) 3100	5000	3800	2200 S	1500 S
	MW-206B	(9/89) 2900	110	36	82 S	58/54 S
	B-3A	(3/84) 120	6400	1300	73	NR
	B-3B	(3/84) 1800	1300	50	25	NR
	B-4A	(7/89) 44	60	100	47 S	140 S
	MW-801A	(2/92) 5	---	3.3	3.8	NR
	MW-801B	(6/91) 420	540	340	110 S	53
	MW-801C	(6/91) 460	490/450	340	120 S	72
	MW-802B	(1/92) 3 J	ND	10	27 S	35
	MW-803A	(7/91) 240	490/600	280	160 S	88
	MW-803B	(6/91) 550	730	380	180 S	120
	MW-803C	(6/91) 1500/1300	3500	1700	680/590 S	270
	B-102	(10/82) 120	2300	1500	700	270 S
	SW-5 (Boiling Springs)	(4/84) 44	NS	460/470	120 S	NR
Northern Plume Well Locations	SW-1	(9/89) 13	8	7.7	3.1	8.7
	MW-402A	(9/89) 28	23	15	1.2	0.53
	MW-402B	(9/89) 540	40	49	22	13/14
	MW-401A	(9/89) 910	170	6	16	13
	MW-401B	(9/89) 380	58	2.8	4.7	NR
	MW-401C	(9/89) 6100	530	63	13	120
	B-1A	(3/84) 29,000	3000/2200	1100	300/270	61 S
	B-1B	(3/84) 16,000	4000	740	120 S	59/62 S
	B-2A	(3/84) 56	27	37	7.9	5.9
	B-2B	(3/84) 160	28	46	5.8	2.8
	B-2C	(3/84) 91	83	26	3.1	NR
	B-5A	(3/84) 190	170	91	32 S	16
	B-5B	(7/85) 1760J/640	410	120	44 S	18
	MW-202A	(9/89) 9	20	15	9.5 S	NR
	Mitchell Spring	(10/82) 12	14	6.5	2.5	0.64
	MW-203A	(9/89) 11	4 J	3.9	2.8	NR
	MW-203B	(9/89) 7	6	4.2	3	NR

Source: EPA, 2001a; August 2002 data from SME, 2003

Notes:

1. The sampling locations are listed in increasing distance from the McKin facility. "A" = shallow bedrock well; "B" = deep overburden well; "C" = shallow overburden well
2. NS = not sampled; ND = not detected; NR = not reported
3. J = estimated quantity; E = exceeds calibration range; T = trace; S = secondary dilution result
4. 1500/1300 = duplicate samples collected from this location on that date.

(SME, 2003). To achieve compliance with the SWQC, the TCE loading to the river cannot exceed 0.32 kg/day, which corresponds to a TCE concentration of 2.7 µg/L at the harmonic mean flow of 48 cfs. During 2002, four of the six monthly samples from SW-1 and two of the five monthly samples from SW-201 were below the 0.32 kg/day compliance loading rate (SME, 2003).

Conceptual Groundwater Flow Model

As part of the mediation process, the PRP contractor developed a conceptual groundwater flow model (SME, 1998a). Key points of the model follow. Log-linear regressions were fitted to the historical data after the groundwater extraction and treatment system (GETS) that operated from 1990 to 1995 was shutdown. The vast majority of the groundwater monitoring wells showed downward trends but a few, such as B-4A, showed an upward trend. The presence of these upward log-linear regression trends added uncertainty to predicting when in the future the aquifer would attain the standards.

During the late 1990s, as part of the mediation process, the EPA contractor (TtNUS) and the PRP contractor (SME) completed estimates of the time required to reach the Royal River SWQC of 2.7 µg/l TCE. A series of regressions were completed, using available groundwater monitoring well data, to estimate when the TCE concentration at a given monitoring well would achieve a 68 percent reduction, the reduction in concentration necessary to achieve the river standard. The contractors also analyzed TCE loadings to the Royal River and used regression graphs to predict when the SWQC would be met.

The correlation coefficient or R-squared value of the regressions ranged from 0.11 to 0.89 for groundwater trends and 0.66 for the trend of TCE flux to the river. The regression trends formed the basis for projecting the time frame for the groundwater to achieve a 68 percent reduction in TCE concentrations and for the Royal River to meet the SWQC of 2.7 µg/L or a loading of 0.32 kg/day at the harmonic mean flow of 48 cubic feet per second (cfs). The regression analysis predicted a 68 percent reduction in TCE would be achieved in a time frame ranging from 2002 (at well B-3) to 2036 (MW-206); the river standard would be met in a time frame ranging from 2002 to 2007 (TtNUS 1999b). The estimated time to reach the MCL for TCE at wells and springs in the eastern and northern plumes is shown in Table 6-2 (EPA,

TABLE 6-2
ESTIMATED TIME TO REACH GROUNDWATER MCL FOR TCE
FIVE-YEAR REVIEW
MCKIN COMPANY SITE
GRAY, MAINE

	Well or Spring	Estimated Year to Reach TCE Cleanup Goal (5 µg/l)	
		TtNUS Nov. 1997 Extrapolations	SME March 1999 Extrapolations
Eastern Plume Well Locations	MW-401A	2020	2003-2009
	MW-401B	--	2000-2019
	MW-401C	1999	2005-2026
	MW-212C	--	--
	MW-206A	2030	2036
	MW0206B	2002	2004-2040
	B-3A	2001	2003
	B-3B	1999	2003
	MW-801B	2016	2019
	MW-801C	2010	2019
	MW-802B	2006	--
	MW-803A	2018	2023
	MW-803B	2015	2019
	MW-803C	2026	2026
	B-102	2041	2038
	SW-5 (Boiling Springs)	2014	2013
	SW-1	2000	
	Maximum	2041	2040
Northern Plume Well Locations	MW-402A	--	--
	MW-402B	--	2022
	MW-401A	2021	2003-2009
	MW-401B	--	2000-2019
	MW-401C	1999	2005-2026
	B-1A	2015	2013
	B-1B	2016	2013
	B-2A	2018	2011-2025
	B-2B	2023	2009-2015
	B-2C	2008	--
	B-5A	2008	2008
	B-5B	2012	2011
	MW-202A	2007	2006
	Mitchell Spring	--	--
	Maximum	2023	2026

Source: EPA, 2001a

Notes:

1. The sampling locations are listed in increasing distance from the McKin facility.
2. "A" = shallow bedrock well; "B" = deep overburden well; "C" = shallow overburden well.
3. The MW-401 cluster is included in both plumes.

2001a). The table compares extrapolations prepared with historical data through 1997 (TtNUS) and historical data through 1999 (SME). The two extrapolations compare favorably for many of the wells, and for Boiling Springs.

Decreasing TCE concentration trends in the groundwater plume are believed to be responsible for the declining TCE levels in the river. The PRP contractor estimated that between 180 to 270 gpm of contaminated groundwater was discharged to the river system from the Site with approximately one-third discharging to Collyer Brook, and the remaining two-thirds discharging to the Royal River. Boiling Springs reportedly discharges 45 gpm and the unnamed stream reportedly discharges about 450 gpm to the Royal River (SME 1999). Based on the RRDZ investigation, the EPA contractor estimated that approximately 295 gpm of contaminated groundwater discharges to the river (TtNUS, 1999).

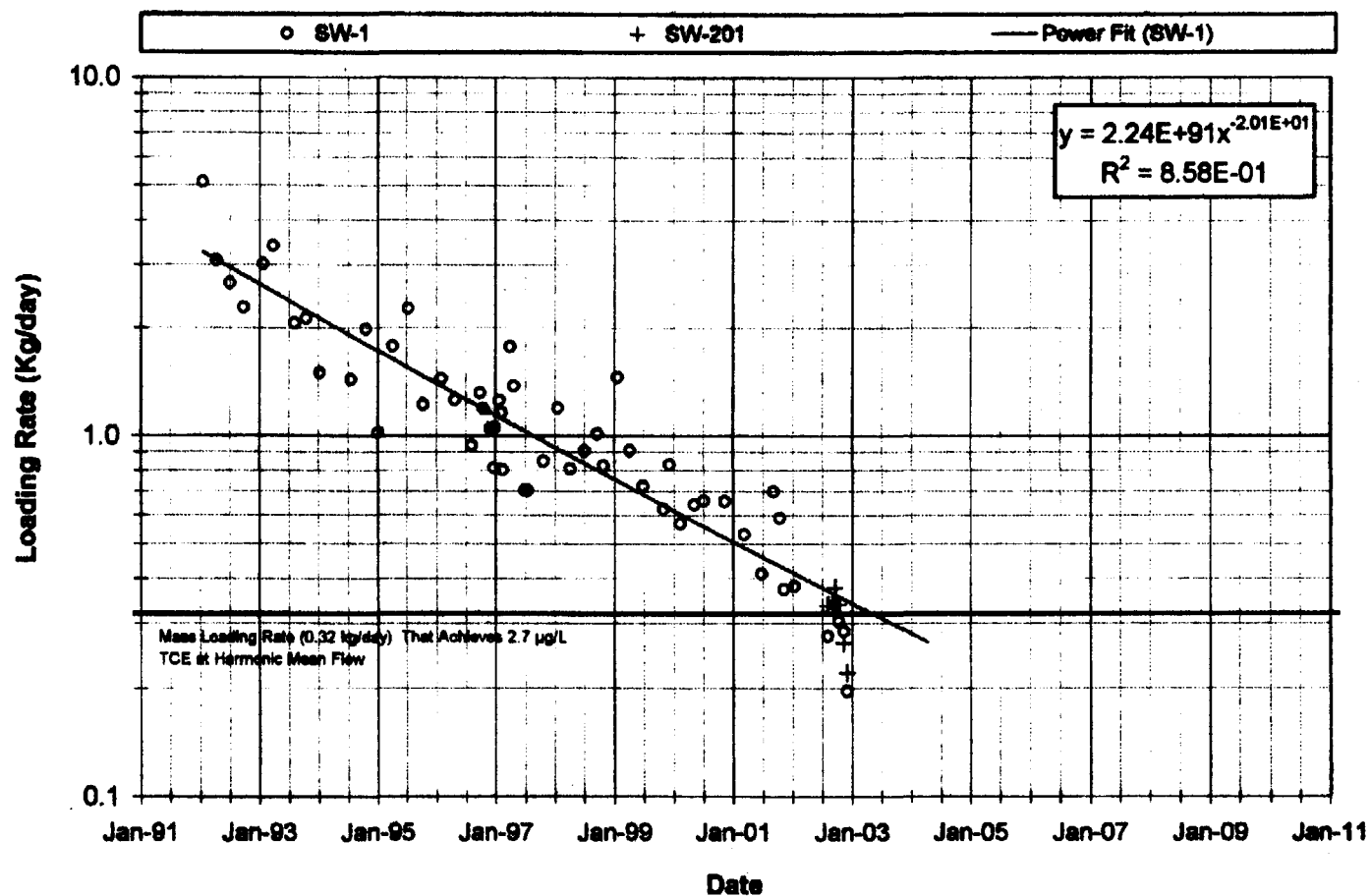
Long-Term Monitoring Plan

The objectives of the LTMP are to evaluate trends in TCE concentrations, and ensure that the plume is not expanding laterally. The latter objective was to be met by the installation and monitoring of the perimeter 900-series wells; however, these wells have not been installed due to access problems. Therefore, the evaluation of the lateral extent of the plume has not been performed. The LTMP also includes surface water monitoring performed at five stations on the Royal River at varying frequencies (see Figure 6-1). The PRP contractor's monitoring reports present groundwater and surface water data in graphical and tabular formats and evaluate trends over time as described in the LTMP (SME, 2001).

Wells currently sampled as part of in the LTMP are sampled annually, semi-annually, and triennially. Once the 900-series wells are installed they will be monitored on a quarterly basis for at least one year, and then on a semi-annual basis. As wells reach MCL, or MEG levels, over a specified time frame, the PRPs may petition EPA and MEDEP to abandon a group of wells and thus reduce the extent of the monitoring well network. The most recent groundwater monitoring results (August 2002) are shown in Table 6-1. The PRP contractor's Second Quarter 2002 Water Quality Results Transmittal includes graphs of the TCE concentrations over time for the monitoring wells but does not include a regression analysis to estimate the time frame to achieve the TCE cleanup goal (5 µg/l) (SME, 2003).

GRAPH C-1 TCE Mass Loading Into the Royal River January 1992 to Present

(USGS Gage Ratio 1997-2002 used for 1992-98 data,
SME 1002 S-D Curve or measurements used for 1998-Present)



SOURCE: SME, 2003.

TCE MASS LOADING INTO THE ROYAL RIVER			
FIVE-YEAR REVIEW			
MCKIN SITE — GRAY, MAINE			
DRAWN BY:	D.W. MACDOUGALL	REV.:	0
CHECKED BY:	P. CALL	DATE:	SEPTEMBER 4, 2003
SCALE:	AS NOTED	FILE NO.:	DWG\7613\0600\FIG_6-1.DWG

FIGURE 6-1



TETRA TECH NUS, INC.

55 Jonspin Road

Wilmington, MA 01887

(978)658-7899

The PRP contractor's Second Quarter 2002 Water Quality Results Transmittal shows the TCE mass loading rate for SW-1 and SW-201 plotted over time (see Figure 6-1) (SME, 2003). The 2002 TCE data for SW-1 ranged in concentration from 0.86 to 8.7 µg/l with a calculated TCE loading rate ranging from 0.20 to 0.38 kg/day. The 2002 TCE data for SW-201 ranged in concentration from 0.80 to 10.6 µg/L, with a calculated TCE loading rate ranging from 0.22 to 0.38 kg/day (SME, 2003). Four of the six samples from SW-1, and two of the five samples from SW-201 were below the compliance loading rate of 0.32 kg/day in 2002 (SME, 2003). These results, as shown on Figure 6-1, project that the time to reach the compliance limit has decreased slightly based on comparison with previous data.

6.5 Site Inspection

A site inspection was conducted on June 11, 2003, with representatives from EPA, MEDEP, and EPA's contractor. The inspection included the McKin facility, the impacted areas within the bounds of the McKin Site, existing and planned monitoring well locations, and the Boiling Springs remediation area. A Site inspection report, including site photographs, is included in Appendix B.

6.6 Interviews

General discussions and observations were documented during the site inspection on June 11, 2003. Telephone interviews were completed as a follow up to the site inspection. The list of individuals interviewed regarding this five-year review is shown in Appendix C.

Rebecca Hewett, MEDEP, commented on the difficulties MEDEP has encountered in obtaining complete copies of each of the 19 recorded restrictive covenants. MEDEP received copies of the recorded restrictive covenants for the 19 properties in the ICZ on June 25, 2003. MEDEP completed the recording process for the two conservation easements in early 2002.

Helen Taylor, Town of Gray Tax Assessor, commented that there is now little interest or concern about the Site by the citizens of Gray. She also noted that the presence of the Site has not impacted home values in East Gray and that growth has tended to be in North Gray, rather than East Gray. Ms. Taylor was not aware of any wells that had been installed in East Gray; all

homes are on town water. Current land use designations and local land use ordinances, and FEMA floodzone maps were obtained from the Gray Municipal Offices.

James Porter, Superintendent of the Gray Water District, had participated in the McKin mediation group and was quite familiar with the Site. He stated that the town had not been successful in locating new groundwater supply wells in the East Gray area due to the contamination and that the available groundwater resources are adequate for the town. Mr. Porter concurred with Ms. Taylor that property values have not been impacted by the Site and there is little public concern regarding the Site. He confirmed that all homes within the ICZ are supplied by the Gray Water District; a new water line was being installed in September 2003 on George Perley Road to provide municipal water to new homes there.

The Gray Public Library has the 1985 and 2001 Administrative Records and site documents. Not all of the site information was on the open shelves; the 2001 Administrative Record was provided in CD format. The librarian commented that few individuals have accessed the documents.

The Town Council's Report in the Annual Report of the Town of Gray, Maine for the fiscal year ending June 30, 2002, noted that an accomplishment during the year was the "...implementation of an Institutional Control Zone restricting the use of ground water due to the efforts of the local people."

7.0 TECHNICAL ASSESSMENT

7.1 Question A: Is The Remedy Functioning As Intended By The Decision Documents?

Remedial action performance and monitoring results. Demobilization and final closure for the soil remedy at the McKin property were completed in June 1987. These activities were carried out in accordance with the 1985 ROD, under an EPA and MEDEP issued Administrative Order. The ROD Amendment issued in 2001 only addressed the off-site groundwater, therefore all source control activities were completed in accordance with the 1985 ROD.

The information presented in Soil Remediation and Site Closure Report prepared by the PRP contractor, showed that the Site soils have been remediated in accordance with the requirements of the 1985 ROD. The voluntary remediation, involving the excavation and on-site treatment of approximately 12,000 cubic yards of VOC- and petroleum-contaminated soils, reduced the risk of further groundwater contamination at the Site. The source control remedy included the treatment, stabilization and placement of soils on-site. The report submitted to EPA in 1987, as dictated by the ROD, completed the Source Control remedy.

The groundwater remedy set forth in the 1985 ROD was modified by a 1990 ESD changing the method of treated groundwater discharge from surface water discharge to groundwater reinjection. That same year, the GETS was installed; the GETS operated until 1995, when it was temporarily shut down. After several years of mediation, an off-site groundwater remedy including long-term monitoring, establishment of an ICZ, and a new series of wells was accepted by all parties and was set forth in the March 2001 ROD Amendment. The GETS was permanently shut down in December 2001, when the Amended Consent Decree was entered by the court. Groundwater monitoring results indicated that TCE was detected both on the McKin property and off-site, therefore the ROD Amendment required a moratorium on groundwater use within the boundaries of the ICZ. This was completed with the adoption of the Gray Groundwater Ordinance in January 2002. Since contamination remains on the Site, five-year reviews will be required until the contaminant concentrations reach levels below federal and state guidelines.

Contaminant levels in groundwater have been decreasing. Because the groundwater discharges to the Royal River, and because contaminant levels in groundwater have been

decreasing with time, levels in surface water are also expected to decrease. Surface water monitoring will continue to verify the downward trend. No specific surface water remedial action was included in the Amended ROD, however if long-term monitoring indicates that contaminant levels are not below SWQCs by 2009, the contingency response will be necessary. Surface water monitoring continues, and TCE levels continue to decrease. Therefore at the time of this review, the surface water portion of the remedy is functioning as intended.

Operations and Maintenance Costs. The GETS system on the McKin property was officially deactivated in December 2001. The dismantling of the system is included in the POP (revised April 2003) and is set to be completed within five years.

Because the groundwater treatment system will be dismantled, there are no longer any system O&M costs. Current O&M costs are derived from day-to-day site maintenance, namely snow plowing, fence repair and building maintenance. However, as set forth in the POP, when site decommissioning and well abandonment are completed, between 2007 and 2011, the Site will be returned to the property owner and O&M will no longer be performed.

Opportunities for Optimization. A procedure to reduce the groundwater monitoring well network has been incorporated into the LTMP and the ROD Amendment. The PRP contractor's monitoring reports include recommendations for changes in status of monitoring wells. The PRP contractor's Second Quarter 2002 Water Quality Results Transmittal identified wells that have not had detectable levels of contamination in multiple rounds of testing and proposed that they become inactive (SME 2003). Since it is part of the LTMP, the inactivation of "clean" wells will continue to optimize the long-term monitoring.

Indicators of Remedy Problems. A review of routine groundwater and surface water monitoring data indicates that groundwater concentrations remain above the 1985 ROD and 2001 ROD Amendment performance standards (SME 2003). However, since the ARARs for groundwater were waived in the 2001 Amended ROD, as long as the LTMP is implemented properly, and regression analysis continues to show a downward trend in VOC contamination, then the remedy is functioning as intended. The continued decrease in groundwater concentrations has thus far correlated with the decrease in surface water concentrations as well (SME, 2003). The source control remedy has been completed.

Implementation of Institutional Controls. The ROD Amendment set forth institutional controls that must be implemented for the McKin property and 124 surrounding properties to protect human health and the environment. Institutional controls implemented for the Site included a Town Ordinance barring the use of groundwater at the 124 properties within the ICZ, and restrictive covenants placed on 19 sub-dividable properties within the ICZ. Because contamination was discovered in residential wells in the late 1970s, residents in the area have been supplied by the public water system since 1978 (EPA, 1985). The implementation of these institutional controls thus far has ensured the integrity of the remedial measures conducted at the Site and has prevented exposure to Site soils and groundwater. The MEDEP received complete copies of the 19 recorded restrictive covenants on June 25, 2003. No activities have been observed on the Site that would suggest violation of the institutional controls.

7.2 Question B: Are The Exposure Assumptions, Toxicity Data, Cleanup Levels And Remedial Action Objectives (RAOs) Used At The Time Of Remedy Selection Still Valid?

Changes in Standards and TBCs. As part of this five-year review, Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered (TBC) guidance for the Site were reviewed, and a review of current ARARs was conducted. The 1985 ROD contains health-based performance standards, not ARARs, since the Site is a pre-SARA site. Due to the fact that the soil remedy has been completed, the soil-specific performance standards cited in the 1985 ROD have been met. ARARs identified in the 2001 ROD Amendment, as well as current ARARs and TBCs that are applicable to this five-year review, are provided in Appendix D of this Report for reference.

The soil remedy was completed in compliance with the performance standards included in the 1985 ROD. Currently, there are no chemical-specific ARARs that apply to soil contaminants at the Site because the soil contamination remedy has been completed. The only TBC guidance that was written following the 1985 ROD is the 1997 Maine Remedial Action Guidelines (RAGs). The Maine RAGs for TCE range from 19 to 400 ppm for residential, trespasser and adult worker guidelines. These values are above the 0.1 ppm performance standard set (and attained) for treated soils in the 1985 ROD. Additionally, since the soil remedy has been completed and has been deemed acceptable by the agencies, the remedy remains protective of human health and the environment.

The primary changes to standards applicable to groundwater since the 1985 ROD are the introduction of the MCL for TCE (5 ppb) and the 1992 Maine Maximum Exposure Guidelines for Drinking Water (MEGs). The 1992 MEG for TCE is 5 ppb, which is lower than the 1985 ROD performance standards (28 ppb). However, these MEGs were revised in 2000, and the value for TCE was revised to 32 ppb. The 2000 revisions have not been promulgated. According to the MEDEP, the 1992 MEGs were referenced in the Maine hazardous waste regulations, and therefore are enforceable and applicable. The 1985 ROD performance standard for 1,1,1-TCA is 92 ppb, which is below both the applicable and revised MEGs. The following table illustrates the 1985 clean-up goals with the MCLs and 1992 MEGs and the 2000 TBC MEGs.

Contaminant of Concern	1985 ROD Clean-up Goals ¹	MCL	1992 MEG	2000 MEG (TBC)
trichloroethylene	28	5 ²	5	32
1,1,1-trichloroethane	92	200	200	200
cis-1,2-dichloroethene	no ROD standard	70	70	70
1,1-dichloroethene	no ROD standard	7	7	0.6
tetrachloroethene	no ROD standard	5	5	7
vinyl chloride	no ROD standard	2	0.15 ³	0.2

¹ all concentrations/standards are in micrograms per liter (µg/L) or parts per billion (ppb)

² established after the 1985 ROD

³ detection limit varies with location and is generally greater than the 1992 MEG

With the adoption of the 2001 ROD Amendment and subsequent Consent Decree, the groundwater ARARs (e.g. MCLs and MEGs) were waived, and long-term monitoring was required to ensure contaminant levels continue to decrease with time. A risk assessment was also conducted (Burke, 1998), and it was determined that wading or swimming in the river was "unlikely to result in an exceedance of 1E-04 or an HQ of 1". Therefore, as long as contaminant levels continue to decrease, contamination reaching the Royal River will not pose a threat to human health and the environment.

A new ARAR was added when the 1990 ESD was issued. This ESD changed the discharge location for treated groundwater from surface water discharge to underground reinjection

through infiltration galleries. Maine's Underground Injection Control Program regulation, 38 MSRA 413(1-B), Chapter 543, is an applicable requirement. Injection wells used for previously contaminated groundwater that has been treated are defined as Class V wells. Class V wells may be used provided injection does not "result in a violation of any Maine Primary Drinking Water Standard, or which may otherwise adversely affect human health" (EPA, 2001b). However, since the GETS has ceased operation and is to be dismantled, this ARAR is no longer applicable.

The 1998 National Recommended Water Quality Criteria was introduced since the 1985 ROD and is applicable to surface water monitoring at the Site. This federal guidance sets forth criteria, but is not promulgated and therefore not enforceable. On the state level, the Maine Statewide Water Quality Criteria (SWQC) are enforceable requirements that are by and large the same as the federal guidelines. The SWQC are chemical-specific ARARs included in the 2001 ROD Amendment. The Maine standards for Class B waters prohibit the discharge of TCE in excess of 2.7 ppb, based on human health for consumption of water and organisms.

TCE has been detected in the Royal River since 1989 (EPA, 2001). Since 1992, concentrations have been decreasing, following the pattern of groundwater concentrations. The 2001 ROD Amendment states that SWQC levels should be reached in 6 to 8 years. Monitoring must continue, in accordance with the amended remedy, to ensure protectiveness and to document the continued decline in surface water contaminant concentrations.

Changes in Exposure Pathways. Exposure scenarios identified in the risk assessment performed in the FS included direct ingestion, dermal absorption, and inhalation for soils, as well as direct ingestion of groundwater (EPA 1985). As stated in the 1985 ROD, "Current and potential health and environmental risks involved with no action alternatives are associated primarily with contaminated groundwater. For exposures to other environmental media, the risks are insignificant based on comparisons with relevant guidelines and the risk assessment performed in the FS." Since the issuance of that document, exposure to contaminated groundwater has been discontinued through restrictive covenants, institutional controls, and the engineered cover at Boiling Springs. Land use at the Site has not changed and is not expected to change.

The only additional route of exposure could be potential indoor air exposure because of the known presence of the contaminant plume beneath residential properties in Gray. A draft EPA guidance document entitled "Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils" (EPA 2002) addresses this issue. Additionally, the MEDEP has promulgated Ambient Air Quality Standards that would apply to TCE in residential indoor air.

Changes in Toxicity and Other Contaminant Characteristics. The major contaminant of concern that contributed most to the cancer risk potential at the Site was TCE. In 2002, the cancer slope factor (CSF) and Risk Reference Dose (RfD) for TCE were withdrawn from the EPA Integrated Risk Information System (IRIS). These values are under review and will be published in the near future. Until the values are made public by the EPA, they are not an applicable standard. In order to ensure that the previously conducted risk characterizations remain protective, the new standards, once published, should be compared to the values used to calculate risk in the FS to ensure remedy protectiveness.

Changes in Risk Assessment Methods. The only changes in risk assessment methods include the way in which risk to constituents in air is estimated, and the use of certain exposure estimates for soils. Some of the default exposure assumptions for soils have changed, specifically for dermal exposure, based on studies reviewed by EPA. While these changes could affect the risks in minor ways, the soils have been remediated so there is no potential for exposure. The target cleanup goals set in the ROD remain protective for the exposures and receptors identified for the Site.

Expected Progress Towards Meeting RAOs. The soil remedy was completed and met the specified remedial action goals as documented in the PRP contractor's 1987 report. Overall, the groundwater concentrations are decreasing and as long as they continue to do so, the selected remedy is functioning within the limits of the 2001 Amended ROD. The ROD Amendment estimated it would take 50 years of monitoring to attain the performance standards. The agencies should be able to determine, by adhering to the scheduled monitoring, whether or not this forecast remains accurate. Because it has only been two years since the ROD Amendment, it will be more appropriate to gauge the progress toward groundwater performance standards during the next scheduled five-year review.

7.3 Question C: Has Any Other Information Come To Light That Could Call Into Question The Protectiveness Of The Remedy?

Since no new ecological targets were identified during the five-year review, monitoring of ecological targets is not necessary. No other information has been discovered that would call into question the protectiveness of the remedy.

7.4 Technical Assessment Summary

According to data reviewed, observations from the site inspection, and interviews, the remedy is generally functioning as intended by the 1985 ROD and 2001 ROD Amendment. The source control portion of the remedy is complete. Facility demobilization and closure was completed in 1987 and the agencies confirmed that the intended source control remedial objectives were met. The soil remedy at the Site remained protective of human health and the environment through its completion. The POP has been approved by the agencies, triggering the implementation of the LTMP by the PRP's in accordance with the ROD Amendment.

The implementation of institutional controls, including a groundwater ordinance placing a moratorium on groundwater usage, has thus far ensured the integrity of the remedial measures conducted at the Site, and prevented exposure to Site soils and groundwater. The 900-series wells, intended to serve as confirmation that the plume has not extended beyond its currently delineated boundary, have not been installed and tested. The zoning ordinance and the restrictive covenants prevent exposure to contaminated groundwater within the ICZ, but until the 900-series wells are installed, adjustments to the ICZ boundaries cannot be made.

The PRP's 1987 evaluation of site soils following completion of soil treatment concluded that clean up goals had been met and that the site-specific clean-up goals were consistent with the RAGs. For groundwater, the Maine MEGs and the federal MCLs are the primary ARARs. The performance standard for groundwater is 5 µg/L for TCE. The groundwater treatment system has been permanently shut down; the 2001 ROD Amendment includes long-term groundwater monitoring and overlapping institutional controls for the off-site remedy. The performance standard is protective because it is equivalent to the MCL and Maine MEG for TCE. The groundwater remedy will be protective when the groundwater reaches the performance standard based on the timeframe set forth in the 2001 ROD Amendment.

Guidance applicable to surface water monitoring at the Site introduced since the 1985 ROD includes the 1998 National Recommended Water Quality Criteria. On the state level, the Maine SWQCs are enforceable requirements that are by and large the same as the federal guidelines. For the two most recently detected contaminants, TCE and 1,1,1-TCA, only TCE has an SWQC of 2.7 µg/L, based on human health consumption of water and organisms. Surface water monitoring is included in the off-site remedy described in the 2001 ROD Amendment and therefore must continue.

Land use at the Site has not changed and is not expected to change, and there are no additional routes of exposure. Indoor air quality does not appear to have been addressed previously, most likely due to the depth of groundwater below properties in the ICZ. In the 1985 ROD, cancer potency factors for TCE were used to calculate risk. Those values have since been withdrawn by the EPA. Once the new values are published, risk should be recalculated to ensure protectiveness.

8.0 ISSUES

Surface water and groundwater monitoring in accordance with the LTMP is required by the ROD Amendment and therefore should continue as scheduled to ensure that VOC concentrations continue to decrease and that the plume does not expand. During mediation proceedings, regression analysis using Site data was conducted to estimate the decrease in TCE concentrations over time. The PRP contractor stated that this analysis for groundwater data was discontinued since the data show decreasing contaminant concentrations that track the predicted time frames (Muzzy 2003). Because there is no active remediation on-going at the Site, such analysis is beneficial in decisively showing that the TCE concentrations, while declining, are doing so in the time frames estimated by TtNUS in 1997 and SME in 1999. The vast majority of the groundwater monitoring wells showed downward trends but a few, such as B-4A, showed an upward trend. The presence of these upward log-linear regression trends added uncertainty to predicting when in the future the aquifer would attain the standards.

Section III.5.(d) of the revised Remedial Action Work Plan, Appendix A to the Consent Decree, requires a review of the LTMP coincident with the five-year review, beginning with the next review. There are 28 wells, and one spring, currently included in the LTMP (SME, 2003). As designated by the LTMP, 5 µg/L is the "inactive" sampling threshold. After the August 2002 sampling round, nine locations (B-2B, MW-201A, MW-201B, MW-207A, MW-207B, MW-212C, B-103A, MW-402A and Mitchell Spring) were proposed for retirement from routine monitoring because they had reached the inactive threshold. This practice should continue through future monitoring rounds to improve the efficiency of long-term monitoring and to illustrate the attenuation of the contaminant plumes.

Since the amended Consent Decree was entered into court and the GETS was permanently shutdown, active groundwater remediation has ceased. Restrictive covenants have been placed on 19 properties within the ICZ to ensure that the groundwater is not used for any purpose to eliminate the possibility of exposure through direct contact or ingestion. The 124 properties within the boundaries of the ICZ are subject to the provisions of the municipal groundwater ordinance. A restrictive covenant has not yet been obtained for the McKin property.

One issue that has not been addressed directly is that of indoor air quality. The contaminant plume is known to be present in the subsurface beneath residential properties in Gray. Although depth to groundwater is approximately 40 feet throughout most of the area, it may be necessary to perform calculations or collect soil gas samples for VOC analysis to ensure that there is no threat to indoor air quality from VOC vapors. The EPA draft guidance on vapor intrusion should be reviewed as well as the current Maine Ambient Air Quality Standards, which would apply to TCE. The current Maine Hydrocarbon Ambient Air Quality Standard is 160 $\mu\text{g}/\text{cm}^3$ over any three hour period at any location, which may be exceeded once per year. It may be beneficial to revisit the risk characterization now that the agencies have approved long-term monitoring for the groundwater plumes, to ensure that indoor air quality is not being affected.

At the time of this review, several components of the ROD Amendment and amended Consent Decree had been initiated but not finalized. To ensure the protectiveness of measures taken at the Site, it is imperative to adhere to the schedules set forth in the Amended RAWP and POP. Additionally, all reasonable efforts should be made to have a final Restrictive Covenant placed on the 7-acre McKin property parcel.

During the site inspection, EPA and MEDEP commented that they, and the PRPs, were having difficulty obtaining access to private properties for the installation of the 900-series wells. As those wells are a requirement of the ROD Amendment, their installation is necessary for the selected actions to be protective. If the issue of access becomes such that the agencies feel it will be impossible to install the 900-series wells, then the necessity of this well series, or another alternative should be revisited.

The EPA has withdrawn the CSFs and RfDs for TCE, the contaminant contributing most to risk at the Site. The values are being reviewed and once the new values are published the recalculation of the overall Site risks would be appropriate to ensure remedy protectiveness.

9.0

RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Of the three remedies for the Site, only the source control has been completed. Thus the issues and recommendations below all deal with the groundwater and/or surface water remedies.

Issue	Recommendations /Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
					Current	Future
Regression Analysis	Update regression analysis of groundwater data during every five-year review.	PRPs	EPA/State	Fall 2003	N	N
Scope of LTMP	Review coincident with the five-year review.	PRPs/EPA/ State	EPA/State	Fall 2003	N	N
Indoor Air Quality	Evaluate risk based on Hydrocarbon Ambient Air Quality Standard and federal guidance.	PRPs	EPA/State	As soon as possible	N	N
POP/ RAWP Schedule	Tasks must be carried out on-schedule as much as possible.	PRPs	EPA/State	Throughout long-term monitoring	N	N
McKin property Restrictive Covenant	Continue good faith efforts to obtain a restrictive covenant for the McKin property.	PRPs	EPA/State	As soon as possible	N	N
900-series Wells	Continue attempts to obtain access, revisit need for wells if access can not be obtained	PRPs	EPA/State	As soon as possible	N	Y
Risk Values	After new TCE values are published, recalculate risk in the subsequent five-year review.	PRPs	EPA/State	Fall 2008, assuming new TCE values are published by then.	N	N

The remedies are expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. Considering the historical decline of TCE concentrations across the Site, EPA expects the groundwater to achieve the performance standards within 50 years without any active remediation. The threat of groundwater contamination from soils was mitigated by the excavation, treatment and stabilization of the contaminated soils. Other threats posed by the Site have been addressed through institutional controls, including establishment of an ICZ, a municipal groundwater ordinance; a moratorium on groundwater usage through restrictive covenants that are preventing exposure to, or the ingestion of, contaminated Site groundwater; and sampling off-site wells included in the LTMP.

Long-term protectiveness of the remedial action will be verified by the collection and analysis of groundwater and surface water samples during long-term monitoring. Current data indicates that the plume is not expanding. Installation of the 900-series wells would provide greater certainty that the conceptual understanding of the extent of contamination is correct and would increase confidence that the ICZ boundaries are appropriate. The available data and analysis indicate that the remedy is functioning as required to achieve Site performance standards.

EPA has recently released a draft guidance document dealing with the vapor intrusion pathway. Based on the screening process presented in this guidance, there is insufficient site data to rule out the applicability of this exposure pathway. Additional work, and possibly ongoing monitoring, will likely be needed to ensure that there is no threat to indoor air quality from VOC vapors.

11.0 NEXT REVIEW

A fourth five-year review for the McKin Company Site will be conducted in 2008.

APPENDIX A
DOCUMENT REVIEW LIST/REFERENCES

DOCUMENTS REVIEWED/REFERENCES CITED

Annual Report of the Town of Gray, Maine. for Fiscal Year July 1, 2001 through June 30, 2002.

Burke, 1998. *Worst Case Human Health Risk Screen*. U.S. EPA Region I, Ann Marie Burke. (Administrative Record # 6755). January 1998.

CMR 38:465,3. Code of Maine Regulations, Title 38, Chapter 465, Section 3.

DeBisschop, 1997. *Regression Graphs of Monitoring Well Data*. Karl DeBisschop, Raytheon Environmental Services. (AR# 6596) November 1997.

EPA, 1985. *Record of Decision, McKin Site, Gray, Maine*. U.S. Environmental Protection Agency, Region I. July 1985.

EPA, 1998. *Five-Year Review, McKin Site, Gray, Maine*. U.S. Environmental Protection Agency, Region I. September 30, 1998.

EPA, 2001. *Final Draft Technical Impracticability Evaluation Report, McKin Superfund Site, Gray, Maine*. U.S. Environmental Protection Agency, Region 1. (AR#8463) 2001.

EPA, 2001a. *ROD Amendment, McKin Superfund Site, Gray, Maine*. U.S. Environmental Protection Agency, Region 1. March 2001.

EPA, 2001b. *Appendix A to Amended McKin Consent Decree, Revised Remedial Action Work Plan, McKin Superfund Site, Gray, Maine*. U.S. Environmental Protection Agency, Region 1. July 2001.

EPA, 2001c. *Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P*. U.S. Environmental Protection Agency, Region 1. June 2001.

FEMA, 1982. Flood Insurance Rate Map, Town of Gray, Maine. Community Panel Number 230048 0005 A. January 6, 1982.

Gray Zoning Regulations, 2000. Amended to January 18, 2000.

Lyford, F.P., Flight, L.E., Stone, Janet Radway, Clifford, Scott, 1999. *Distribution of Trichloroethylene and Geologic Controls on Contaminant Pathways near the Royal River, McKin Superfund Site Area, Gray, Maine*. U.S. Geologic Survey, Augusta, Maine (AR# 6570) 1999.

McDonald, David F., 1996. *Aquatic Toxicity Information Retrieval (AQUIRE) Database Search*. Lockheed Martin Environmental Systems & Technology Co. (AR# 6253) 1996.

Muzzy, 2003. Telephone communication between Matt Muzzy, SME and Phoebe Call, TtNUS. June 18, 2003.

SME, 1989. *Well and Water Supply Inventory: Cumberland Center, Maine*. Sevee & Maher Engineers, Inc., (AR# 6504) 1989.

SME 1997. *Sampling and Analysis Data: Royal River Sample Data*. Sevee & Maher Engineers, Inc. (AR# 6607) August 1997.

SME, 1997a. *Current Understanding of the Site Conceptual Model at McKin*. Sevee & Maher Engineers, Inc. (AR# 6403) October 1997.

SME, 1998. *Subsurface Investigation Report, Gray Depot Area*. Sevee & Maher Engineers, Inc. (AR# 6249) 1998.

SME, 1998a. *Time Estimates to Meet Royal River Cleanup Criteria*. Sevee & Maher Engineers, Inc.. (AR# 6598) September 1998.

SME, 1999. *Data Transmittal and Site Conceptual Model Description, Volumes 1 & 2*. Sevee & Maher Engineers, Inc. (AR# 6600-02) 1999.

SME, 2001. *Long-Term Monitoring Plan*. Sevee & Maher Engineers, Inc. April 25, 2001.

SME, 2003. *Second Quarter 2002 Water Quality Results Transmittal, McKin Superfund Site, Gray, Maine*. Sevee & Maher Engineers, Inc. January 2003.

SME, 2003a. *Project Operations Plan, Volume 1, McKin Superfund Site, Gray, Maine*. Sevee & Maher Engineers, Inc. February 2002 (Revised April 2003).

Swain, 2003. Telephone communication between Elizabeth Swain, Barton Gingold Eaton & Anderson, and Phoebe Call, TtNUS. June 19, 2003.

TtNUS, 1998. *Royal River Trichloroethylene Loading Trend Analysis*. Tetra Tech NUS, Inc. (AR# 6583) December 1998.

TtNUS, 1999. *Aquifer Test Analysis and Groundwater Trichloroethylene Flux*. Tetra Tech NUS, Inc. (AR# 6398). 1999.

TtNUS, 1999a. *Revised Royal River TCE Loading Trend Analysis*. Tetra Tech NUS, Inc. (AR# 6585) June 1999.

TtNUS, 1999b. *Draft Feasibility Study, Royal River Discharge Zone*. Tetra Tech NUS, Inc. (AR# 8457) August 1999.

APPENDIX B
SITE INSPECTION REPORT

McKin Company Five-Year Review Site Inspection – June 11, 2003

Attendees:

Terry Connelly – EPA RPM
Becky Hewett – MEDEP, Project Manager
Hank Andolsek – MEDEP, Geologist
Phoebe Call – TtNUS, EPA Contractor, Project Manager
Katie Lang – TtNUS, EPA Contractor, Project Scientist

The Site Inspection commenced at approximately 10:00 AM at the McKin facility and continued around the impacted area, known as the McKin Site, until approximately 2:00 PM. The weather was partly sunny with showers in the afternoon, temperature was in the 70s. Observations made by the EPA contractor and other participants are noted below.

Field Notes:

The approximately 7-acre McKin facility is fenced with a locked access gate. Fairly dense vegetation surrounds the facility perimeter, partially obscuring portions of the fence. While posted with no trespassing signs in the past it was difficult to discern whether signs remain due to the dense vegetation.

There has been no documented vandalism or trespassing during the either active or currently inactive remedial operations at the facility according to Matt Muzzey, Sevee Maher Engineers (SME), PRP contractor.

There is a large parking area behind the main gate with the GETS treatment building to the right. The building is in good condition and currently contains pieces of equipment from the GETS which will be removed during decommissioning activities in the future. The building has been used by the PRP contractor for storage of equipment and the office area appears to be used on an ongoing basis as there is utility and phone service. There do not appear to be any records stored on-site. Since the facility is located close to the offices of SME, it is visited frequently and SME personnel drive by the facility weekly.

Monitoring wells and other PVC pipes (likely from the former infiltration galleries), as well as some electrical boxes, remain on site. The monitoring wells observed were all locked. To the north side of the treatment building there is a large concrete pad that was used for decontamination during remedial activities at the facility. Buried piping remains in the area of the two infiltration galleries. All of these structures will be removed during decommissioning activities.

The topography of the site was modified during the source control remedial activities from the steep walls of the former gravel pit to the more sloping "bowl" shape currently seen. The entire site is well vegetated with grasses and a number of volunteer trees and shrubs. The group walked the majority of the area, including the locations of the two former infiltration galleries. All of the four extraction wells for the GETS are located off-site. Two of the four extraction wells were installed in low-yield areas and thus the total GETS operated at approximately 45 gpm, rather than the 80 gpm design flow. The two most productive wells were located in relatively clean portions of the aquifer; the two low-yield wells were also the most contaminated.

There was no O&M associated with the source control remedy. Since the GETS was permanently shut down in December 2001, there is no O&M associated with that remedy other than the future plans for decommissioning remaining site structures, fence, etc.

After leaving the McKin facility, the group drove to Juniper Farms and then walked down to the Royal River to observe Boiling Springs. The area is all part of the McKin Site, as the groundwater beneath is impacted by contamination from facility operations. The topography is rolling hills with a number of ravines that lead to the river. The gabion wall at Boiling Springs is in very good repair; a small discharge from the springs to the river was observed in the area.

The group then drove around the area generally included in the institutional control zone. Properties included in the group of 19 with restrictive covenants were pointed out, as were areas where the planned 900 series monitoring wells would be located.

Site photographs taken during the Site inspection follow this report.

Visit to Town of Gray Municipal Offices

The Town Assessor, Helen Taylor, provided a copy of the FEMA floodplain map for the Collyer Brook/Royal River area. Town zoning maps were reviewed; the McKin facility is in a RRA – rural residential/agricultural zone with an overlying AOZ – aquifer overlay zone.

According to Ms. Taylor, there is little concern or interest in the McKin site by the citizens of Gray. The Assessor noted that property values have not been impacted by the site. Growth has tended to be in North, rather than East Gray. As all homes are on town water, the Assessor was not aware of any wells that had been installed in East Gray.

Tax assessment information is on-line. The property, Map 38, Lot 20, is owned by Aubine Dingwell; all property taxes are current.

The Town adopted a new groundwater ordinance, Chapter 404, on January 22, 2002. This ordinance was part of the actions for the institutional control zone included in the revised Consent Decree, entered in December 2001.

Visit to Gray Water District

TtNUS spoke briefly with James Porter, Superintendent of the Gray Water District. Mr. Porter had participated in the McKin mediation and is quite familiar with the site. He stated that the town has not been successful in locating a safe public groundwater supply in East Gray, since the East Gray aquifer has been widely impacted by site contaminants. Most of the town water comes from wells in North Gray.

Mr. Porter concurred with the Town Assessor's statements that property values have not been impacted by the site and that there is little public notice paid to the site.

Visit to Gray Public Library

The McKin 1985 Administrative Record is available on open shelves in the library. A few smaller documents are filed in nearby file cabinets. The 2002 Administrative Record was

provided in CD format by EPA. The librarian stated that there is little interest paid to the McKin documents.

McKin Site Inspection Photographic Record

Photo No: 1

Date: June 11, 2003

Comments: McKin property. Back of GETS building looking east toward Mayall Road.

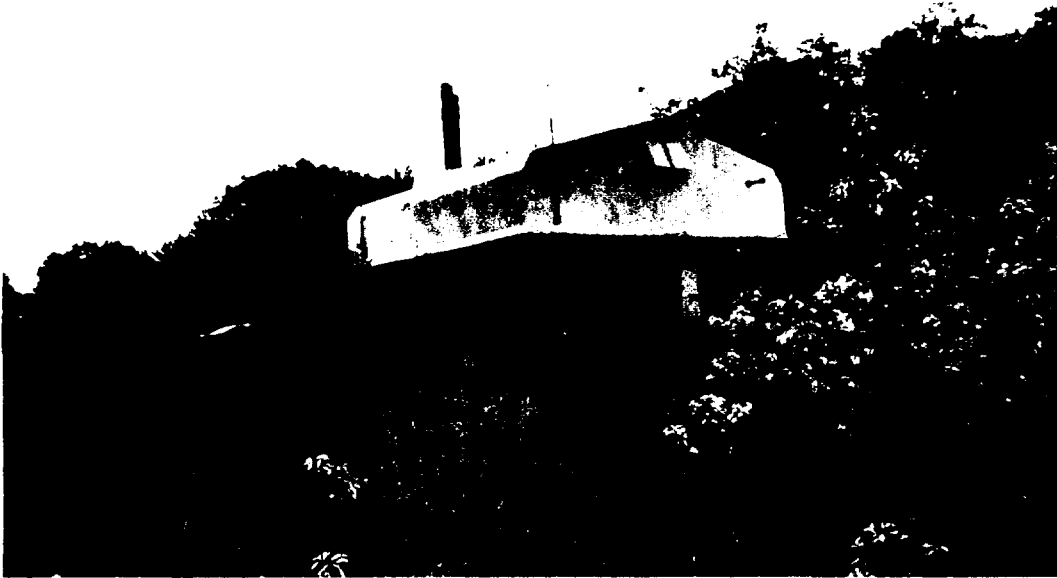


Photo No: 2

Date: June 11, 2003

Comments: McKin property. Concrete pad used for decontamination; to the right of the GETS building, looking west.



McKin Site Inspection Photographic Record



Photo No: 3

Date: June 11, 2003

Comments: McKin property facing west. Note: rise in center of picture with 3 white pipes is a former infiltration gallery.



Photo No: 4

Date: June 11, 2003

Comments: McKin property facing north. Rise at left is one infiltration gallery (seen in Photo No. 3); rise in background is the second infiltration gallery.

**McKin Site Inspection
Photographic Record**



Photo No: 5

Date: June 11, 2003

Comments: Juniper Farms, access point to Royal River and Boiling Springs from Mayall Road. Note terrain.



Photo No: 6

Date: June 11, 2003

Comments: Boiling Springs. Note gabion wall, concrete cover, and dense vegetation.

**McKin Site Inspection
Photographic Record**



Photo No: 7

Date: June 11, 2003

Comments: At Boiling Springs looking downstream. Area very well revegetated.



Photo No: 8

Date: June 11, 2003

Comments: Royal River at Depot Road railroad crossing, looking upstream toward confluence of Collyer Brook.

APPENDIX C
INTERVIEW LIST

INDIVIDUALS INTERVIEWED FOR THE MCKIN COMPANY
FIVE-YEAR REVIEW

Name/Position	Organization/Location	Date
Terrence Connelly/EPA RPM	EPA/Boston, MA	June 2003
Rebecca Hewett/ Project Manager	Maine DEP/Augusta, ME	June 2003
Helen Taylor/ Tax Assessor	Municipal Offices/ Gray, ME	June 11, 2003
James Porter/ Superintendent	Gray Water District / Gray, ME	September 4, 2003
Matt Muzzy/ Project Engineer	Sevee and Maher Engineers/ Cumberland, ME	June 2003
Lisa Carr/ Reference Librarian	Gray Public Library/Gray, ME	June 11, 2003
Elizabeth Swain/ PRPs' spokesperson	Barton Gingold Eaton & Anderson	June 19, 2003

APPENDIX D
ARARS AND TBCS

IDENTIFICATION OF PROBABLE CHEMICAL-SPECIFIC ARARs AND TO-BE-CONSIDERED CRITERIA, ADVISORIES, AND GUIDANCE

REQUIREMENT/GUIDANCE	STATUS	REQUIREMENT/GUIDANCE SYNOPSIS
GROUNDWATER		
<i>Federal Regulatory Requirements and Guidance</i>		
SDWA – Section 1412 –MCLs (40 CFR 141.11-141.16)	Waived*	MCLs have been promulgated for several common organic and inorganic contaminants. MCLs regulate the concentration of contaminants in public drinking water supplies, but are also considered applicable as discharge requirements for reinjection of treated groundwater.
EPA Risk Reference Doses (RfDs) (EPA, November 1999, Integrated Risk Information System)	To be considered	RfDs are an estimate of a daily exposure concentration that is likely to be without appreciable risk of deleterious effects during a lifetime exposure.
EPA Carcinogen Assessment Group Carcinogenic Potency Factors (CPF's) (EPA, RAGs, March 1995)	To be considered	The CSF is used to estimate an upper-bound probability of an individual developing cancer as a result of a lifetime exposure to a particular concentration of a potential carcinogen.
Proposed MCLs and MCLGs	To be considered	Proposed MCLs and proposed non-zero MCLGs were considered in establishing the groundwater cleanup goals.
<i>State of Maine Regulatory Requirements and Guidance</i>		
Hazardous Waste Management Rules (06-096 CMR Chapter 800-802, 850-851, 854, 856-857)	Applicable	These rules incorporate RCRA hazardous waste regulations, including standards for hazardous waste facilities and manifesting requirements. "No hazardous waste or constituent or derivative thereof shall appear in ground or surface waters at a concentration above background level, or above current public health drinking water standards for Maine, including the Maximum Exposure Guidelines, or standards for aquatic toxicity, whichever is more stringent (Chapter 854, 58(A)(3)(a)). [Note: Per MEDEP, the 1992 MEGs are incorporated by reference in these rules.]
Maine Drinking Water Rules (10-144A CMR Chapters 231-233)	Relevant and Appropriate	Maine's Primary Drinking Water Standards are equivalent to federal MCLs.

* MCLs have been waived for technical impracticability, but will be used to determine final clean-up of groundwater and the ultimate decision of the ICZ.

IDENTIFICATION OF PROBABLE CHEMICAL-SPECIFIC ARARS AND TO-BE-CONSIDERED CRITERIA, ADVISORIES, AND GUIDANCE
(CONTINUED)

REQUIREMENT/GUIDANCE	STATUS	REQUIREMENT/GUIDANCE SYNOPSIS
GROUNDWATER		
<i>State of Maine Regulatory Requirements and Guidance (cont'd.)</i>		
Rules Relating to Testing of Private Water systems for Potentially Hazardous Contaminants (10-144A CMR Chapter 233)	To be considered	These rules establish MEGs used in determining whether to waive fees for testing for potentially hazardous contaminants in private wells.
Maximum Exposure Guidelines (MEGs) for Drinking Water (Bureau of Health, Maine Department of Human Services, January 20, 2000)	Waived*	MEGs are the Bureau of Health's most recent recommendations for concentrations of chemical contaminants in drinking water. MEGs are health-based guidelines (e.g. TBC) and are not legally enforceable.
SOIL		
<i>State of Maine Regulatory Requirements and Guidance</i>		
Implementation of Remedial Action Guidelines (MEDEP, Updated May 20, 1997)	To be considered	The guidance provides concentration levels for direct contact exposure levels for contaminants that are protective of residential, trespasser, and adult worker populations.
SURFACE WATER		
<i>Federal Guidance</i>		
National Recommended Water Quality Criteria (Federal Register, Part IV, FRL-OW-6186-6a, December, 1998)	To be considered	This guidance describes the recommended criteria for 157 pollutants used in implementing environmental programs.

* MEGs have been waived for technical impracticability, but will be used to determine final clean-up of groundwater and the ultimate decision of the ICZ.

IDENTIFICATION OF PROBABLE CHEMICAL-SPECIFIC ARARs AND TO-BE-CONSIDERED CRITERIA, ADVISORIES, AND GUIDANCE
(CONTINUED)

REQUIREMENT/GUIDANCE	STATUS	REQUIREMENT/GUIDANCE SYNOPSIS
SURFACE WATER (Cont.)		
<i>State of Maine Regulatory Requirements</i>		
Maine Statewide Water Quality Criteria (SWQC) 38 MRSA § 361-A 06-096 CMR Ch. 530.5	Applicable	These standards pertain to water quality statutes for the State of Maine.
AMBIENT AIR QUALITY		
Maine Ambient Air Quality Standards 38 MRSA § 584-A 06-096 CMR Ch. 110	Applicable	These standards pertain to ambient air quality statutes for the State of Maine.

IDENTIFICATION OF PROBABLE ACTION-SPECIFIC ARARs AND TO-BE-CONSIDERED CRITERIA, ADVISORIES, AND GUIDANCE

REQUIREMENT/GUIDANCE	STATUS	REQUIREMENT/GUIDANCE SYNOPSIS
GROUNDWATER		
<i>State of Maine Regulatory Requirements</i>		
Maine Underground Injection Control Program regulations, 38 MSRA § 413(1-B), Chapter 543	Applicable	These rules regulate the use of wells to inject substances into the subsurface, specifically "injection wells used to help clean up contaminated groundwater, either by injecting solutions to neutralize contamination or to return previously contaminated groundwater that has been treated."

IDENTIFICATION OF PROBABLE LOCATION-SPECIFIC ARARs AND TO-BE-CONSIDERED CRITERIA, ADVISORIES, AND GUIDANCE

REQUIREMENT/GUIDANCE	STATUS	REQUIREMENT/GUIDANCE SYNOPSIS
GROUNDWATER		
<i>State of Maine Regulatory Requirements</i>		
Maine Standards for Classification of Groundwater (38 MRSA., Chapter 3, Section 470)	Applicable	Groundwater is classified under the Maine Standards. The groundwater at the UCC Site is classified as GW-A (i.e., water shall be of such quality that it can be used for domestic purposes.
SURFACE WATER		
<i>State of Maine Regulatory Requirements</i>		
Maine Standards for Classification of Fresh Surface Waters, 38 MRSA, § 468	Applicable	Royal River is classified as a Class B water body under state water quality standards.
WETLANDS/FLOODPLAINS		
<i>Federal Regulatory Requirements</i>		
Executive Order 11990, Protection of Wetlands (40 CFR Part 6, Appendix A)	Applicable	The Wetlands Executive Order requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.
Executive Order 11988, Floodplain Management (40 CFR Part 6, Appendix A)	Applicable	This Executive Order requires that a remedial action must reduce the risk of flood loss, and restore and preserve the natural and beneficial values served by floodplains.
<i>State of Maine Regulatory Requirements</i>		
Maine Natural Resources Protection Act (NRPA, 38 MRSA § 480-A) and regulations at Chapters 305, 310	Relevant and Appropriate	This law and its regulations prohibit the degradation or destruction of streams and brooks by prohibiting alterations in or adjacent to protected natural areas without a permit. At the UCC Site, removal of soil or alteration of structures next to streams must not cause unreasonable soil erosion, and must meet other standards.
OTHER NATURAL RESOURCES		
<i>State of Maine Regulatory Requirements</i>		
Maine Solid Waste Management Rules, Chapters 404, 405	Applicable	These rules regulate the disposal of construction/demolition debris, and disposal of special waste.

APPENDIX E

**MEDEP REVIEW COMMENTS ON "FIVE-YEAR REVIEW REPORT"
DATED AUGUST 20, 2003 AND SEPTEMBER 11, 2003**

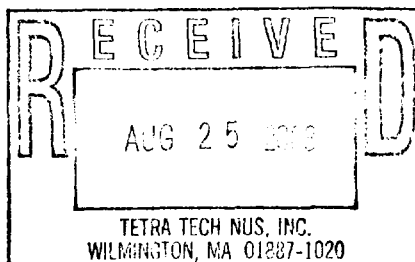


STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR

DAWN R. GALLAGHER
COMMISSIONER

August 20, 2003



Mr. Terrence Connelly
U.S. EPA, Reg. 1
1 Congress Street
Suite 1100 (HBT)
Boston, MA 02114-2023

Re: Review Comments on "Draft Five-Year Review Report" for the McKin Company Site,
Gray, Maine" dated July 2003

Terry
Dear Mr. Connelly:

The Maine Department of Environmental Protection has reviewed the revised "Draft Five-Year Review" report dated July 2003, for the McKin Company Site, Gray, Maine. This report was prepared for the U.S. Environmental Protection Agency (EPA) by Tetra Tech NUS, Inc. (TtNUS).

The MEDEP's review comments on the July 2003 Draft Five-Year Review report are presented in Attachment A to this letter.

If you have any questions or concerns regarding this letter, please contact me directly at (207) 287-8554 or at (207) 287-2651.

Sincerely,

Rebecca L. Hewett

Rebecca L. Hewett, Project Coordinator
Division of Remediation
Bureau Remediation & Waste Management

pc: Denise Messier, MEDEP
Hank Andolsek, MEDEP
Mary Jane O'Donnell, EPA
✓ Phoebe Call, TtNUS

5-yrReview draft7-03.doc

JGUSTA
STATE HOUSE STATION
JGUSTA, MAINE 04333-0017
(207) 287-7688
RAY BLDG., HOSPITAL ST.

BANGOR
106 HOGAN ROAD
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769-2094
(207) 764-0477 FAX: (207) 764-1507

Attachment A

General Comments

1. Please review and edit the text for grammatical and tense errors.

Specific Comments

2. Page ES-1, 2nd paragraph, 6th sentence & throughout document: Replace Responsible Parties (RPs) with either Potentially Responsible Parties (PRPs) or Settling Parties (SPs).
3. Page ES-1, 3rd paragraph, 2nd sentence: The 1993 report evaluated the expansion of the GETS east of Mayall Road and the agencies (MEDEP & EPA) concurred that a GETS expansion was not technically practicable.
4. Page ES-1, 3rd paragraph, 3rd sentence: Amend the text to read, "...MEDEP approved the temporary shutdown of..."
5. Page ES-1, 3rd paragraph, last sentence: Amend the text to read "...long-term monitoring, based on the estimated 50-year timeframe for achieving the cleanup standards." EPA will not take action if standards have not been attained in 50 years. EPA and MEDEP based their acceptance of a minimal groundwater remedy on a projected estimate of 50 years before the groundwater is restored.
6. Page ES-1, Last paragraph 1st sentence: The ICZ incorporates 124 properties, not just the facility plus the 19 with restrictive covenants. This is a very important point, since the amended remedy calls for "overlapping" institutional controls. Note that the purpose of the two conservation easements differs from that of the restrictive covenants. The conservation easements are intended to compensate for damage to the Royal River.
7. Page ES-2, 1st full paragraph: The remedy "continues to be implemented" but the surface and groundwater monitoring "is to be conducted". Please clarify. Also, the MEDEP is uneasy with the "walk away" description of institutional controls. The report should address compliance with the ordinance and restrictive covenants. A simple statement that no new houses have been constructed, or that any new houses are served by the water district, will suffice. We need to get away from the "papers have been filed so things must be okay" mode of IC oversight.
8. Page ES-2, 2nd full paragraph: Essentially the same as Comment #7. Institutional controls have been established, but the report does not support a conclusion that they have been effective.
9. Page ES-2, 2nd full paragraph, 1st sentence: Amend the text to reflect that not all of the remedies have been implemented, that is, the 900-series monitoring wells have yet to be installed.

10. Page ES-2, Five-Year Review Performance Statement: It is somewhat inaccurate to portray the remedy as effective upon attainment of the standards. The remedy will be completed and successful upon attainment, however, it also needs to be effective in the interim. The site soil remedy is complete. Please consider substituting "institutional controls are expected to control exposure" for "institutional controls are preventing exposure".
11. Page 2-1, Event - "State cleaned and removed the remaining above ground tanks" entry: Amend the date in Date column to read 1983 instead of 1985.
12. Page 2-1: Add the following event & date - "MEDEP designated the site an Uncontrolled Hazardous Substance Site" & "November 1985".
13. Page 2-1: Add the following event & date - "EPA issued Administrative Order with 2 PRPs to conduct soil aeration pilot study" & "August 1985".
14. Page 2-1: Add the following event & date - "EPA & MEDEP issued Administrative Order with 15 PRPs to conduct soil aeration treatment" & "July 1986".
15. Page 2-1, "A voluntary remedial action..." entry: Amend entry to read "VOC and petroleum contaminated...site by soil aeration."
16. Page 2-1, next to last entry: Amend entry event & date to read, "Consent Decree endorsed by US District Court, District of Maine" & "November 21, 1988".
17. Page 2-1, last entry: Amend entry event & date to read, "PRPs consultant submitted the Groundwater Remediation and Monitoring Work Plan and the "Project Operations Plan" & "December 1988".
18. Page 2-2: Add the following event & date - "First Amendment to Attachment A To The Consent Decree signed" & "October 1989".
19. Page 2-2: Add the following event & date - "Second Amendment to Attachment A To The Consent Decree signed" & "July 1990".
20. Page 2-2, "RPs submit a report...aquifer within 200 years" entry: Amend event entry to read, "PRPs submit "Technical Analysis Of The Ability Of Groundwater Extraction & Treatment To Restore The Aquifer In The Area East Of The Mayall Road" document. Report assessed the technical practicability of expanding the GETS to the east side of Mayall Road and concluded it was not practicable."
21. Page 2-2: Add the following event & date - "Third Amendment to Attachment A To The Consent Decree signed" & "October 1995".
22. Page 2-2, "RPs submit a Technical Impracticability Evaluation" entry: Amend the event entry to read, "PRPs submit the Draft Evaluation of Technical Impracticability Report".

23. Page 2-2, "Groundwater restoration mediation process (EPA, MEDEP, PRPs, Town of Gray)" entry: Add ", etc." after "Town of Gray".
24. Page 2-2: Add the following event & date - "Memorandum of Understanding signed by EPA, MEDEP, PRPs, Town of Gray & Gray Water District" & "November 2000".
25. Page 2-2, Last 2 entries: Amend the date to read "December 7, 2001" instead of "December 6, 2001".
26. Page 2-3, "Conservation Easements signed and recorded" entry: Amend the event entry to read, "Conservation Easements recorded".
27. Page 2-3, "Restrictive Covenants signed and recorded" entry: The property owners signed the restrictive covenants in January and April of 2001. The MEDEP received recorded copies of the 19 restrictive covenants on June 25, 2003. The MEDEP does not know the date when the actual recording of the restrictive covenants at the Registry of Deeds occurred. Please amend the chronology as appropriate to present the information provided in this comment.
28. Page 3-5, 2nd full paragraph, 1st sentence: Please label the railroad trestle on Figure 3-2 and clarify what is meant by "discharges through a narrow section".
29. Page 3-6, last paragraph: Please add that the ICZ includes 124 properties.
30. Page 3-8, 3rd paragraph: What about other influences such as the pumping of residential bedrock wells? The pumping of these wells influenced to distribution of the contaminant plume and needs to be included in the text.
31. Section 4: Include text that describes further the temporal and spatial extent of TCE contamination in the Royal River as it was a major concern and contested issue during the mediation.
32. Page 4-5, Section 4.3: Amend the first sentence text to read, "The March 2001 ROD amendment which modified the groundwater..." Also, redraft this section to explain how the 50 year timeframe relates to the technical impracticability decision.
33. Page 4-6, 1st full paragraph: Delete "and properties where restrictions preventing installation of water wells were deemed necessary" and replace it with "and areas where contaminated groundwater could migrate in the future". Describe all the groundwater use restrictions within the ICZ, namely the municipal ordinance and the restrictive covenants, but defer the conservation easements until later. Also, include a discussion of why extra protection was needed for the larger lots, namely the concern about future development changing the boundaries of the plume.
34. Page 4-7, 1st paragraph after table: Amend the text to read, "...monitoring program, which major components..."

35. Page 4-7, 2nd paragraph after table: Amend the first sentence to read, "Prior to the 1985 ROD TCE was detected in Boiling Springs but not in the Royal River". In the last sentence change "showed" to "predicted". Only data to be collected in the future can "show" what happens with TCE.
36. Page 4-7, last paragraph: In general the presence and extent of TCE in the Royal River is not presented very clearly in the report. Amend the second sentence to read, "Discharge of TCE in excess of the State Water Quality Criteria of 2.7 ppb is prohibited."
37. Page 4-9, top paragraph: Amend the text to present that the purpose of the contingency is to fund an active remediation, but it might not be "in the river" and it would be implemented by MEDEP not the PRPs.
38. Page 4-9, Section 4.3.2, 1st paragraph: Amend the date of the signed Amendment to Consent Decree to read "December 7, 2001" instead of "October 2001".
39. Page 4-9, Section 4.3.2, 2nd paragraph: Provide additional information on the content of the restrictive covenants. A reader in the future may not understand why the potential for subdivision was such a concern. The covenants restrict use of groundwater by requiring that future development be supplied with water from the water district, not from private wells.
40. Pages 4-9 and 4-10: The blending of tenses makes it hard to discern what has actually taken place. How many rounds of sampling under the LTMP have taken place? The most recent data in Table 6-1 was collected in 8/02. Clearly the monitoring of the 900 series wells is not included. According to this paragraph the monitoring results "appear to be tracking" but no trend analysis is being done. Please clarify the text.
41. Page 5-1, bullets: The blending of tenses is confusing. Please separate the threats identified in 1998 from the subsequent actions to address the threats.
42. Page 5-1, paragraph after bullets: Amend the text as follows, "The ROD Amendment, which incorporated the agreements arrived at during the mediation process, included: implementation of ~~an institutional control zone~~, a municipal groundwater use ordinance and acquisition of including restrictive covenants on certain properties to prevent use of contaminated groundwater..."
43. Page 5-1, bottom of page: Delete either "identified" or "included".
44. Page 6-1, Section 6.1, last sentence: Add Denise Messier as one of the MEDEP review team.
45. Page 6-2, 1st paragraph, last sentence: Delete the last sentence, as it is somewhat subjective. There has been a fair amount of discussion with some

property owners in "recent years". The municipal ordinance was passed less than two years ago.

46. Page 6-2, Section 6.4.1, 1st paragraph, 1st sentence: Amend the sentence to read, "...excavation of approximately 12,000 cubic yards..." Specifically, a total of 11,456 cubic yards of contaminated soil was excavated and treated on-site. It consisted of 9,556 cubic yards of VOC contaminated soils and 1,900 cubic yards of petroleum contaminated soils.
47. Page 6-3 Table 6-1: TCE concentration information is available for August 2002 in the SME's Second Quarter 2002 Quarterly Water Quality Results report dated January 2003. The document reports the August 2002 TCE concentration for SW-1 to be 8.7 ug/l. Include this TCE concentration in Table 6-1.
48. Page 6-4 1st paragraph: The log-linear regression on a few monitoring wells (such as, B-4A) showed an upward trend. The presence of these upward log-linear regression trends added uncertainty to predicting when in the future the aquifer would attain the standards. Include this information in the report text.
49. Page 6-8, Section 6.5: Delete the references to on-site and off-site. Substitute "McKin facility" for "on-site". Note that the on-site and off-site terms used in Section 7 need to be addressed as well.
50. Page 6-8, Section 6.6, 2nd paragraph: Rebecca Hewett does not recall commenting "the difficulties ... to complete decommissioning activities". She did comment on the difficulties encountered in obtaining copies of the 19 recorded restrictive covenants. The MEDEP received copies of the 19 recorded restrictive covenants on June 25, 2003. Please amend text.
51. Page 7-1, 1st paragraph, 2nd sentence: Please amend "Unilateral Order" to read "Administrative Order".
52. Page 7-1, 2nd paragraph, 2nd sentence: Approximately 12,000 cubic yards of VOC and petroleum contaminated soils were excavated and treated on-site (see Comment #46 above). Amend text.
53. Page 7-1, 3rd paragraph, 2nd sentence: The GETS was temporarily shutdown in) October 1995. Permanent shutdown of the GETS occurred on December 7, 2001 when the Amended Consent Decree was entered by the court.
54. Page 7-1, 3rd paragraph: Please clarify what is meant by "the POP for this LTMP". (If the POP was no approved until October 02, and the most recent data is from August 2002, do we have any results that conform to the approved POP?) This paragraph blends present tense items with past tense items. Correct this problem.

55. Page 7-1, 3rd paragraph, last sentence: Please replace "on-site" with "on the site".

56. Page 7-1, last paragraph, 2nd sentence: Amend the text to read, "Because the groundwater discharges to the Royal River, and because contaminant levels in groundwater have been decreasing with time, levels in surface water are also expected to decrease. Surface water monitoring will continue to verify the downward trend."

Also, remove the reference to the conservation easements. It is unrelated to the monitoring and the contingency remedy. The conservation easements compensate the State of Maine for use of the Royal River as a reactor for McKin site contamination. If EPA needs to mention it break it into a stand-alone paragraph.

57. Pages 7-2 & 7-3: The institutional control mechanisms - the ordinance and the covenants - have been executed. That alone does not assure that the controls have been effective. Have any new homes been constructed in the ICZ? If so, are they connected to the public water supply?

Also, make it clear that a total of 124 properties are subject to the groundwater ordinance.

Note that the conservation easements are not intended to protect the public from exposure to contaminants.

58. Page 7-3, paragraph at top of page, next to last sentence: The MEDEP received copies of the 19 recorded restrictive covenants on June 25, 2003.

59. Page 7-3, Section 7.2, 2nd paragraph, 1st sentence: Are there no current chemical-specific ARARs for the soil because the soil contamination remedy has been completed? If so, state that this is the case first and then explain in the text.

60. Page 7-3, last paragraph, 2nd sentence: Replace "target cleanup" with "performance".

61. Page 7-4, top paragraph, 3rd full sentence: Amend the text to read, "The 1985 ROD performance standard for 1,1,1-TCA is 92 ppb, which..."

62. Page 7-5, 1st full paragraph: The current Maine SWQC is not cited correctly. Correct the error. This is an ARAR and it is enforceable. (The Maine SWQC for TEC is 2.7 ug/l based on human health for consumption of water and organisms.)

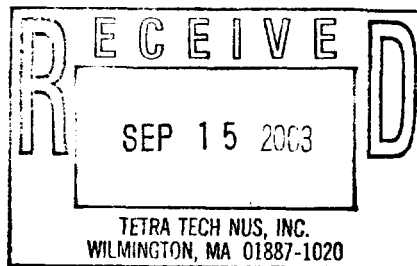
63. Page 7-6, Section 7.4: Since the 900-series monitoring wells have not been installed to-date, how can the Amended ROD remedy be functioning as intended? Amend the text to reflect this discrepancy in the Amended ROD remedy.

64. Page 7-7, 1st full paragraph, last sentence: Clarify the text. This sentence as written does not make sense. Also, the performance standard is the MEG, which is 5 ppb for TCE.
65. Page 7-7 2nd full paragraph: Please explain further and revise the text. Maine has a promulgated standard for TCE in surface water and it is an ARAR.
66. Page 8-1, 1st paragraph: Revise the text to include that not all monitoring wells had a decreasing trend during the regression analysis.
67. Page 8-1, 2nd paragraph, 2nd sentence: Amend the text to read, "After the August 2002 sampling round, nine..."
68. Page 8-1, 3rd paragraph: Add that 124 properties are subject to the provisions of the municipal groundwater ordinance.
69. Page 9-1: For the "900-series Wells" entry under the "Party Responsible" add the PRPs.
70. Appendix B: The site inspection report does not mention any effort to observe the ICZ area for new construction. Earlier in the text the document reported that no activity was observed. Was any effort made to ensure compliance with the ordinance and restrictive covenants?



STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION

JOHN ELIAS BALDACCI
GOVERNOR



DAWN R. GALLAGHER
COMMISSIONER

September 11, 2003

Mr. Terrence Connelly
U.S. EPA, Reg. 1
1 Congress Street
Suite 1100 (HBT)
Boston, MA 02114-2023

Re: Review Comments on Revised "Five-Year Review Report" for the McKin Company Site,
Gray, Maine" dated September 2003

Dear Mr. *Connelly* Connelly:

The Maine Department of Environmental Protection has reviewed the revised "Five-Year Review" report dated September 2003, for the McKin Company Site, Gray, Maine. This report was prepared for the U.S. Environmental Protection Agency (EPA) by Tetra Tech NUS, Inc. (TtNUS).

The MEDEP's review comments on the September 2003 Five-Year Review report are presented in Attachment A to this letter.

If you have any questions or concerns regarding this letter, please contact me directly at (207) 287-8554 or at (207) 287-2651.

Sincerely,

Rebecca L. Hewett

Rebecca L. Hewett, Project Coordinator
Division of Remediation
Bureau Remediation & Waste Management

pc: Denise Messier, MEDEP
Hank Andolsek, MEDEP
Mary Jane O'Donnell, EPA
✓ Phoebe Call, TtNUS

5-yrReviewrevised9-03.doc

AUGUSTA
7 STATE HOUSE STATION
AUGUSTA, MAINE 04333-0017
(207) 287-7688
RAY BLDG., HOSPITAL ST.

BANGOR
106 HOGAN ROAD
BANGOR, MAINE 04401
(207) 941-4570 FAX: (207) 941-4584

PORTLAND
312 CANCO ROAD
PORTLAND, MAINE 04103
(207) 822-6300 FAX: (207) 822-6303

PRESQUE ISLE
1235 CENTRAL DRIVE, SKYWAY PARK
PRESQUE ISLE, MAINE 04769-2094
(207) 764-0477 FAX: (207) 764-1507

Attachment A

Specific Comments

1. Page ES-1, 3rd paragraph, last sentence: Amend the text to read, "...natural processes was estimated to be 50 years."
2. Page ES-2, 1st paragraph, 3rd sentence: Amend the text to read, "...on these properties, conservation easements for two properties to protect against future development along sections of Collyer Brook and the Royal River, and two separate..."
3. Page ES-2, 2nd paragraph, 2nd sentence: Amend the text to read "... their properties and two properties owners have signed conservation easements for their properties that border Collyer Brook and the Royal River.
4. Page ES-2, 3rd paragraph, 6th sentence: Amend the text to read, "A new series of wells (900-series wells)" to provide..."
5. Page ES-2, 4th paragraph, 3rd sentence: Amend the text to read, "Site groundwater is projected to reach..."
6. Page ES-5, next to last paragraph, 2nd sentence: Amend the text to read, "Site groundwater is projected to reach..."
7. Page 2-1, "EPA issued a Unilateral Order...pilot study" Event entry: Amend the Event entry text to read, "EPA issued an Administrative Order with...pilot study". This order was located in the MEDEP site file and is called an Administrative Order not a Unilateral Order.
8. Page 2-1, "A voluntary remedial...by soil aeration" Event entry: Amend the Event entry text to read, "EPA & MEDEP issued an Administrative Order with 14 PRPs to conduct soil aeration treatment. VOC and...by soil aeration." This order was located in the MEDEP site file, is called an Administrative Order not a Unilateral Order, is signed by both EPA & MEDEP and lists 14 PRPs.
9. Page 2-2: Add the following event & date - "First Amendment to Attachment A To The Consent Decree signed" & "October 1989".
10. Page 2-2: Add the following event & date - "Second Amendment to Attachment A To The Consent Decree signed" & "July 1990".
11. Page 2-2, "PRPs submit a report...aquifer within 200 years" Event entry: Amend the text to read, "...concluding that expansion of the GETS...". The purpose of the report was to determine if the GETS should be expanded to the east side of Mayall Road. The determination regarding continuation of the GETS occurred later with the Technical Impracticability Evaluation document.
12. Page 2-2: Add the following event & date - "Third Amendment to Attachment A To The Consent Decree signed" & "October 1995".

13. Page 2-3: "Amendment to Consent Decree entered in U.S. District Court" Event entry: Amend the date to read "December 7, 2001" instead of "December 6, 2001".
14. Page 2-3: "GETS permanently shut down" Event entry: Amend the date to read "December 7, 2001" instead of "December 6, 2001".
15. Page 4-6, last paragraph, last sentence: Amend the text to read, "... overburden and shallow bedrock indicated, for the most part, that drinking...".
16. Page 4-9, 2nd paragraph, 2nd sentence: Amend the text to read, "...on human health for consumption of water and organism (EPA, 2001a)."
17. Page 4-9, Section 4.3.2, 1st paragraph, 1st sentence: Amend the date to read "December 7, 2001" instead of "December 6, 2001".
18. Page 4-10, last paragraph: Amend text to read, "...by MEDEP, on properties that border sections of Collyer Brook and the Royal River, and recorded by..."
19. Page 6-8, Interviews, 2nd paragraph, last sentence: Amend text to read, "...the two conservation easements early in 2002.
20. Page 7-1, 1st paragraph, 2nd sentence: Amend the text to read, "...under an EPA & MEDEP issued Administrative Order."
21. Page 7-3, Section 7.2, last paragraph: Delete the repeated text "that apply to soil contaminants at the site".
22. Page 7-8, top paragraph: Amend the text to read, "... has an SWQC of 2.7 ug/l based on human health consumption of water and organism. Surface water monitoring...".
23. Page 8-2, top paragraph, 5th sentence: Amend the text to read, "...Air Quality Standard is 160 ug/cm³ over...".